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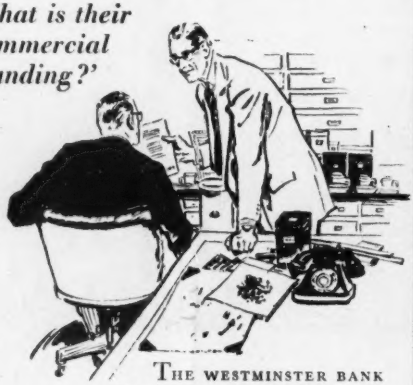

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THIS WEEK'S FEATURES

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NOTES AND COMMENTS

Canada Expands Aluminium Capacity

Decisions to launch immediately a new expansion programme in the Canadian aluminium industry, involving the first stage of a large-scale integrated aluminium development in British Columbia, and construction of another major hydro-electric power plant in Quebec Province were announced a few days ago by Mr. Nathanael V. Davis, president of Aluminium Ltd., in a speech before the annual meeting of the company's shareholders held in Montreal. The developments concerned will be undertaken by the company's subsidiary, Aluminum Company of Canada Ltd., and operations to provide alumina, derived from bauxite ores, will be expanded in the Caribbean area. Capital expenditure required for this programme is $220,000,000 (£73,300,000) of which $160,000,000 will be the estimated cost of the integrated first stage development in British Columbia, including the alumina facilities. The remaining $60,000,000 is the estimated cost of a new 200,000 h.p. hydro-electric plant at the Chute Savanne, on the Peribonka River, in the Saguenay district of Quebec, together with new aluminium ingot facilities to be built in the district. "Prolonged study has been given to the financing of the combined programme," Mr. Davis stated. "Having regard for the funds now in hand and assured, the company believes, under present estimates, that the financial arrangements for the combined developments have been substantially completed. The company further believes that such additional financing as may be required can be handled on a normal basis."

In this connection, it is of more than usual interest that according to a statement issued by the Ministry of Supply, the principles of a new agreement have been settled with the Aluminum Company of Canada to ensure increased aluminium supplies for this country. Under this agreement, the company is to receive a loan of $40,000,000 (about £13,300,000) to be used to finance an important scheme for the expansion of aluminium producing capacity (details of which are given below), to be undertaken by the company in British Columbia and in Quebec. In return, the U.K. is to receive an additional 30,000 tonnes of aluminium metal in 1952 and an additional 40,000 tonnes in 1953, making total deliveries, in those years, of 250,000 and 260,000 tonnes, respectively. Moreover, this agreement also provides that the first call of the Ministry of Supply on 200,000 tonnes per annum of the company's production for 20 years from 1951 shall be supplemented by a further 50,000 tonnes for the 20 years beginning in 1954 and a contract entered forthwith to exercise the combined first call on 250,000 tonnes annually in 1954 and 1955.

Mr. Davis' announcement has brought to an end a lengthy period of investigation and speculation concerning the possible start of aluminium production in the Tweedsmuir Park area of British Columbia. As a result of engineering surveys conducted over several years, it has been determined that low-cost electric power, on which the industry depends, can be obtained by a major engineer-project in the undeveloped area 400 miles north-east of Vancouver. It will be done by utilizing the waters of a chain of interior lakes, which will be dropped through a ten-mile tunnel beneath the coastal mountains to a power-house inside the mountain 2,500 ft. below the level of the lakes. The aluminium smelting plant, and a new town to house workers, will be built near the Indian village called Kitimat, to which raw materials from the Caribbean and other areas will be brought by sea or rail.

A particularly significant feature of this agreement is that it is an instance of Great Britain financing a large-scale industrial development in a dollar country.

The increase expected in Canada's productive capacity for aluminium, resulting from the expansion scheme, is 150,000 tonnes (330,000,000 lb.) per year, bringing total usable integrated capacity over the 550,000 tonnes mark. Of the new increase in capacity, approximately 80,000 to 100,000 tonnes will be in British Columbia, involving the installation of the necessary generating capacity. From the outset, however, the tunnels beneath the mountains and a powerhouse cavern sufficient for 800,000 h.p. will be excavated, thus providing the basis for further expansion.

The company has already embarked on a $45,000,000 programme to develop a site on the Peribonka River, called Chute du Diable, to produce 200,000 h.p. and make possible an aluminium production of approximately 45,000 tonnes.

The decision to build in addition the Chute Savanne power station will permit a further increase of aluminium output in the Saguenay area commencing, according to Mr. Davis, one year from now and thereby assisting the company to meet the large near-term demand which the previous production and expansion programme could not fill.

Construction of the British Columbia scheme, on the other hand, will require more than three years and is

based on long-range considerations which led the company "to prepare itself to maintain at least its relative position as a traditional supplier in international markets."

"Although the annual rate of expenditure and the estimated completion date will depend upon the construction schedule adopted," Mr. Davis pointed out, "it is currently planned to proceed without delay under a schedule which, if maintained, will bring in production of the first aluminium in British Columbia in 1954. Estimated expenditures this year under the programme now in effect will be $23,000,000. It should, however, be remarked, that if at any time there are indications that the additional output will not find markets the construction schedule will be lengthened to coincide with the estimates of future requirements and with the resources available to the company."

Gold Mining in French Guiana

Since the war two companies have, according to *Mineral Trade Notes*, published by the U.S. Bureau of Mines, initiated gold mining operations on an industrial basis in French Guiana, *viz.*, the Compagnie St. Elie, and the Société d'Exploitation Minière de l'Inini. Formerly, gold was mined exclusively by independent placer miners.

The Compagnie St. Élie is reportedly capitalized at Frs.55,000,000. Its concessions are the St. Elie and Dieu Vat placers on the upper reaches of the Sinnamary River. Mechanical sluices have been installed at St. Élie and output is estimated at 16,000 grammes of gold monthly. The Société d'Exploitation Minière de l'Inini was formed by the Banque de l'Indochine, with an initial capital of Frs.150,000,000. Three complete sets of American equipment, including washing plants, have been installed in recent months. Operations, however, have not yet been started. The company's concession is at Placer P.I., or Paul Isnard, near the headwaters of the Lozard River, a tributary of the Mana. In addition, several hundred independent miners operate placers scattered over Inini.

Declared production of gold in 1949 amounted to 443,697 grammes as compared with 423,785 grammes in 1948. However, the authorities state that because of inadequate control, it is probable that some production is never declared. Moreover, gold dust is being used in the interior as a medium of exchange.

Increasing Austria's Coal Output

The post-war reconstruction of Austria's economy and the increased capacity of her industry have resulted in far greater demands for coal. However, since 1918, the country has been heavily dependent on foreign coal to meet its needs—an unfortunate state of affairs at any time and particularly so during the recent period of international tension.

The general shortages in Europe's coal supply which resulted from the Korean war, and the consequent cutting down of deliveries to Austria, have imposed heavily increased demands on Austria's own mines.

According to a recent issue of the *Austrian Economist*, the Austrian Coal Board, working on the assumption that the present strained supply position will persist, has, therefore, drafted a new output plan for the whole of Austria's nationalized mines for 1951. This envisages an increase in output during the current year to a total of 4,870,000 tons, a rise of some 380,000 tons on last year's figures. For each of the years 1952 and 1953, a further increase of 500,000 tons is foreseen, making a total planned expansion of 1,380,000 tons or no less than about 35 per cent of the 1949 figure.

The increases of output so far achieved have been the result of rationalization measures and of large-scale investments principally financed by Marshall Plan credits and it is emphasized that any further expansion in production is only possible if these investments are continued.

The opening up of new coal seams must form part of any plan for increased output and the nationalized undertakings forming the Austrian Coal Board have in the past few years successfully carried out large-scale explorations and preliminary borings. These have resulted in the opening up of new seams capable of producing some 60,000,000 tons of brown coal. These new seams have partly been discovered by the exploration of already existing mines, but are partly also completely new coal-producing territories opened up as a result of geological investigations. For example, the brown coal mines at Langau, in Lower Austria, and at Ostermiething-Trimmelkam, Upper Austria, are located in areas which had for some time been marked down as promising, but could only be finally exploited during the last few years.

Geophysical research is now being carried out in the western sector of the so-called Graz Basin, in the province of Styria. Research is here being done by artificially creating minor earthquakes by means of detonations and then attempting to establish the nature of the deeper substructure of the ground by examining the speed with which the vibrations are transmitted.

An extensive exploration programme is included in the 1951 programme. The borings projected will serve to establish the final extent of coal deposits at Ostermiething-Trimmelkam, the examination of the Fohnsdorf area in Styria, the opening up of further coal supplies near St. Stephan, in Carinthia, and at Zillingdorf, in Lower Austria.

The Austrian Coal Board has received from E.R.P. funds a special credit of 4,000,000 schillings to finance this extensive exploration programme in 1951 and it is hoped that when these investigations have been carried out Austria will be able to produce some 6,000,000 tons a year.

Tungsten Mining in Devon

Following the announcement by Mr. Strauss, Minister of Supply, that the mining of tungsten ore is to be started again in Devonshire, a correspondent writes that the reopening of Bottle Hill wolfram mine at Hemerdon, near Plymouth, Devonshire, had been expected in that district since the latter end of 1950. The vein of wolfram there was discovered by Mr. John Nicholls in 1867, but it was not until 1898 that mining of it was attempted. It was soon abandoned, however, and though another effort was made in 1907 it was not until World War I that operations were carried out in earnest. It was during the later stages of the war that the mine was equipped with plant costing £1,000,000. Some 200 people were employed there, but the plant was never fully operated, and the mine closed down in 1945. For the past six years the plant has been kept on a care and maintenance basis. According to tests made in 1945 the low-grade wolfram deposit extends to at least 4,000,000 tons of ore. The 200,000 tons mined during the war yielded about 180 tons of wolfram and tin concentrates.

The Westwood Committee's Report reviewed the position of the Hemerdon Mine and although they stated that the war-time project did not prove to be an economic proposition they recommended that the mine presented a strong argument for the outlay of capital to prove the extension of the mineral deposit in depth.

Silver Mining in Argyll

Sunart, Argyll, in the west of Scotland, may soon be the scene of silver mining operations. Exploratory work carried out on behalf of the Government has shown promising results and the Department for Agriculture for Scotland, which owns the land, has offered a London mining company the right to work the mines. Once the company has reported its findings to the department, it is understood that it can take up an option, if it so desires, to work the mines for 55 years.

Canada

(From Our Own Correspondent)

Timmins, April 21

Cries of distress are coming with increasing frequency from the lips of those responsible for the operation of gold-producing mines in Canada. In every direction there is serious consideration being given to the question of suspending operations pending a return to more favourable conditions for the economic production of the precious yellow metal. The efforts of the Canadian Government to encourage gold producers to continue operations through payment of a subsidy or "cost-aid" is coming to be looked upon by gold producers as a mere dole—and as but puny compensation being paid by the Government for the right to rob the miners of their own right to sell their own gold on the free markets of the world. Mining men were mild in their criticism of the Government until recent months. Now, however, with the industry threatened with disaster, bitterness is reflected in the public utterances of its leaders.

Hollinger Consolidated, greatest producer of gold so far established in Canada, may be cited as an example of what was "worth" in the past and what has become "waste" in the present: the Hollinger mine went into production in 1910. Since that time some 50,000,000 tons of ore produced 15,000,000 oz. of gold yielding a value of $414,000,000.

JOINT STATEMENT BY OPERATORS

Based on former standards, the mine still contains a vast tonnage of ore. However, company officials are now compelled to say that rock carrying 0.22 oz. gold per ton ($8.30) on an undeveloped level is not considered to be ore. This startling statement has aroused public opinion to a stern realization of the truth. A joint statement from the operators of the producing mines of Ontario and Quebec, issued to their shareholders, declares: "The gold mining operators are not seeking and have never sought a subsidy or charity under the guise of 'cost-aid' or any other form of dole. Even though cost-aid to-day be considered as partial compensation on account of denial to the industry of world prices for its product, it falls far short of justice. It is the considered opinion of the managements of Ontario and Quebec gold mines that the only real answer to the maintenance and rehabilitation of the great gold mining industry of this country is unhampered access to the free markets of the world for our product and a lifting of all restrictions on our people and institutions which presently deny to them the right to own and trade in gold."

FALCONBRIDGE NICKEL—U.S. LOAN RUMOURS

Unofficial reports still persist that the United States Government is considering a loan of $65,000,000 to Falconbridge Nickel Mines for the purpose of building a nickel refinery in either Canada or the United States. Falconbridge officials admit discussions have taken place, but decline any further comment.

Iron ore ranges now known and under development in Canada are expected to provide production of 30,000,000 to 40,000,000 tons of ore annually within the next 10 to 15 years. Close observers are already endeavouring to estimate the magnitude of the forthcoming stimulant to Canadian economy.

Asbestos produced in the province of Quebec during 1950 amounted to about 70 per cent of total world output. The 866,000 tons of asbestos produced during the year in Quebec had a value of $63,000,000. This entailed extraction of 9,000,000 tons of ore and waste. The deepest underground workings are 1,000 ft. vertical, and the largest open pit is 3,000 ft. in diameter and 350 ft. deep.

A nickel deposit discovered more than 20 years ago on Rankin Inlet, near the north-west coast of Hudson's Bay, is to undergo further exploration and development. Work done in 1930 indicated some 125,000 tons of ore-carrying nickel, copper and platinum. Diamond drilling was difficult because of the fact that the ground is permanently frozen to great depth. This necessitates the use of hot water for thawing purposes, and as Rankin Inlet is in the Barren Lands, it is necessary to transport fuel to the area for heating, but new techniques makes use of chemicals with which to heat water, and this is expected to facilitate the proposed campaign of diamond drilling. The Cyril Knight Prospecting Co. was the pioneer in the new field, and has been joined in the renewed effort by Coniagas Mines and James Richardson interests of Winnipeg. The season of navigation in that part of Hudson Bay is limited to about 60 days, beginning about the middle of July. Much of the ore carries 3 to 10 per cent nickel in a deposit that ranges from 8 to 20 ft. in width.

Another big copper producer is in the making—Noranda Gaspe Copper Mines, near Mont St. Louis, on the south shore of the Gulf of St. Lawrence. The Quebec Government is to construct a new hydro-electric power plant to serve the enterprise, which is to include the erection of a concentrator with a capacity of 5,000 tons of ore daily. It has been estimated that the financial outlay may reach $30,000,000. The ore deposits are estimated to embrace 20,000,000 tons carrying two per cent copper and with a further 37,000,000 tons carrying one per cent copper.

The Örsdalen Wolfram and Molybdenite Mines

(From Our Own Correspondent)

Oslo, April 7

The famine in tungsten ores and the widespread enquiries which this has stimulated, lends some interest to the deposits of tungsten and molybdenum ores on Gudlen mountain in Örsdalen in the district of Bjerkreim, Norway. The deposits are situated at between 650 and 700 metres above sea level, and are at present somewhat inaccessible. The climate is severe and windy and the mines are situated high up on the mountain, exposed to all sorts of weather, so that any future operations should be planned to avoid opencast working, which has hitherto prevailed. The most promising way of development is by adit from the valley at a height of about 250 metres above sea level.

Mining was first started on Gudlen at the end of 1904 by the British Molybdenite Co., Ltd., and was stopped in 1909. During the years 1911-1914, and again in 1917 the A/S Christiania Minekompani produced small quantities of wolfram, scheelite and molybdenite. Working was stopped in 1918 and though further surface prospecting was done at the Khausi and Tollevaara V, results were negative.

In 1940 the A/S Det Norske Bergselskap took over the Örsdalen deposits from Mr. H. K. Schaanning of Egersund. Financed by the Germans, an enlarged mining plant, dwelling houses, workshops and a power station of 400 kW. capacity were in process of completion when the war terminated. In cross-cuts put in at the end of an adit, an ore body of some 750 cu. metres with scheelite as the most important mineral was demarcated; 600 assay samples averaged 0.18 per cent WO_3. Samples taken at another time yielded approximately 1.50—2.0 per cent WO_3, and about 0.25 per cent MoS_2. However, nothing is known about the ore above or below the adit level.

As the stage of regular production was never reached, output statistics are not very enlightening. From 1905-1920 the output of wolfram concentrates ranging between 40 and 75 per cent WO_3 amounted to 30.667 tonnes, and up to the present date is computed as 35.776 tonnes, of wolfram ore. What is needed is cross-cutting through the ore zone on the surface above the bottom adit but the work must be costly.

The Great Exhibition of 1851

The Festival of Britain provides an opportunity to the Publishers of *The Mining Journal* to look back to the Great Exhibition of 1851, when this Journal was already in its sixteenth year. The following article which is based on extracts from *The Mining Journal* of one hundred years ago, provides some interesting comparisons with the article on "Minerals and Mining at the Festival" which appeared in the May 4 issue of *The Mining Journal*.

A century ago the "Exhibition of the Industry of all Nations"—popularly known as the "Great Exhibition"—was being acclaimed as the "eighth wonder of the world." Such was the enthusiasm aroused on its opening day that reporters ran out of superlatives and even editors allowed their emotions to outrun their pens.

In *The Mining Journal* of May 5, 1851, the Great Exhibition was described as "the most extraordinary display ever recorded in the volume of the world's history." "Such a scene," continued the Editor, "was the great gathering at Crystal Palace. There was the first magistrate of these realms, surrounded by not only her own protectors, councillors and friends, and the representatives of the whole wealth and science of the kingdom, but by ambassadors from the States of Europe and America, embracing a circuit from the Indus to the Pole, met in brotherly emulation as to who should most advance the progress of science, the development of art, the production of wealth and promotion of the greatest interests of the millions. The olive branch of peace appeared to hallow the building in every corner . . . such a combination of handiwork never was congregated before—from the pin, the needle and other trifles, up to the largest locomotive or ponderous pieces of machinery, iron bridges, etc."

PRINCE ALBERT'S INITIATIVE

According to *The Mining Journal,* the first suggestion for holding a world exhibition in London was made by Prince Albert to the Society of Arts in 1845. Every effort was made to carry the suggestion further, but completely without success, "the public mind being not prepared for such a proceeding and manufacturers being adverse rather than favourable." By great exertions on the part of members of the Society favourable to the project, an exhibition of a less ambitious nature was established in the Society's house in 1847 and was repeated during the following two years. In 1849, this event attracted 70,000 visitors, indicating a complete transformation in the attitude of the public. Prince Albert was therefore advised that the time had arrived for his proposal to be carried out.

In view of the rush to complete preparations for the Festival of Britain by the scheduled date, it is interesting to find from contemporary issues of *The Mining Journal* that considerable stress and travail also attended the birth of the Great Exhibition of 1851. Some controversy was roused by the action of the commissioners in awarding the contract for the erection of the building in Hyde Park without having offered it to public competition. The contract was generally regarded as highly favourable to the undertaking, however, since the contractors agreed to receive only £35,000 during the progress of the work, the remaining £40,000 to be paid when the receipts of the Exhibition had produced that sum.

"RAPID ADVANCE MADE"

"Only a few years ago erection of such a building as the one contemplated," commented *The Mining Journal,* "would have involved a fearful amount of expense, but the rapid advance made in this country in the last 40 years, both in the scientific construction of such buildings and the cheap manufacture of glass, iron, etc., with the amazing facilities in the preparation of sash bars and other woodwork, render an erection of this description, in point of expense, quite on a level with those constructed of more substantial materials."

In some quarters the project was described as far too grandiose and pessimists declared that the Exhibition could never be opened in time. Opponents and sceptics declared that the entire proposal and endeavour to carry out a plan for concentration at one spot of the world's industry was "Utopian, impracticable and impossible, and that, if it was possible, it would lead to the paralysation of our manufacturers and commerce, and the ruin and pauperism of our artisans and mechanics."

"MONSTER SPECIMENS" OF COAL

Nevertheless, interest in the project grew very rapidly, both at home and overseas. "Monster specimens" of coal were sent by British colliers. One 4½ ton block, 7 ft. by 4½ ft. by 3 ft., was obtained from a colliery in the Swansea Valley, half-a-mile distant from the bottom of the pit, which was 106 ft. deep. "The colliers willingly gave three days' labour with only the reward of a barrel of beer."

Two specimens of iron rails "of an extraordinary character" were manufactured at the works of the Governor and Company of Copper Miners. One was a T-headed rail 63 ft. long, weighing 56 lb. to the yd., 20 ft. having hitherto been considered a great length. The other was 49 ft. long and weighed only 60 lb. "These specimens were forwarded by the company's line of rails for shipment at Port Talbot. The event was celebrated by much rejoicing, at which all the workmen were present, and on their return a large number of gentlemen connected with the works assembled in the rail mill and partook of a plenteous collation, at which numerous toasts were given, and the evening passed with much hilarity."

A representative collection of minerals was forwarded from Canada. The American contributions comprised 700 packets weighing between 200 and 300 tons. Among them was an immense block of zinc ore weighing about eight tons, which took 70 men half an hour to raise from the hold and land on the quay. America's exhibits also included "an air-exhausted hermetically sealed coffin, in which a human corpse might be preserved uncorrupted for many ages. It contained a bouquet of flowers as fresh as the day they were gathered."

SOME EXHIBITS OF 1851

Reminiscent of a world now well-nigh forgotten are some of the exhibits which *The Mining Journal* singles out as worthy of special mention. Space was awarded, for instance, to "an improvement in construction of that popular vehicle, the Brougham, which places at the disposal of the owner a double or single carriage, just as convenience or occasion may arise." Another exhibit was "a safety carriage of an entirely new construction, which can be safely and speedily stopped from the inside in the case of danger. Nothing of a similar nature has been invented in our own or other countries." Several "ingenious models" were designed to show the process of the manufacture of gas. Great public interest was roused by the electric clock installed in the transept of the building.

Financially, the Great Exhibition was an enormous success, the surplus actually being described as "embarrassing." Even more satisfactory to *The Mining Journal* was the fact that "the great gathering in the Crystal Palace, with the mechanical wonders which there attracted a world's attention, appears to have aroused a spirit of enquiry on the one hand and a desire to impart information on the other, which will tend to extend the most useful scientific knowledge and advance the interests of all."

Smelting Complex Lead Materials

By C. C. DOWNIE

The lack of correlation between the different processes for handling lead in the condition of sulphide ore, matte and other products has led to a certain confusion when it comes to manipulating the more complex materials in the most expeditious manner. The prevailing weakness in nearly all the established methods of smelting is the large amount of fume which is continually evolved, and which has to be returned for subsequent reclamation. Although electrostatic methods have made great progress in other directions, some of the regular small lead smelters showed a certain reluctance to embark on this project, and continued to use their existing somewhat antiquated system of lengthy cooling flues. These, however, held the advantage where plenty of waste land surrounded the site, and where the location was otherwise favourable, that for no cost, the fume could settle out in the flues, and, with relatively little unskilled labour, be collected and returned for treatment.

ELECTROSTATIC SYSTEM

With the improved electrostatic system, a small efficient plant occupies but little space to make an almost 100 per cent recovery; however, this involves the use of electric current raised to high voltage, and necessitates provisions to prevent accidents. (Some of the large smelters have the doors for entering the electrostatic equipment locked by two locks, with the keys in the hands of two different attendants, so that both men require to be present before any operations can be dealt with, *i.e.*, in order to forestall accidents with the high-voltage current.) Where the lengthy flue system is persevered with, branches of trees, specially selected for the purpose, are allowed to hang down from the roofs, and thereby expose more surfaces for collecting the lead oxides, etc. Of the relatively little research conducted in this work, it was ascertained that with the flues constructed up a nearby hill-side, with the natural draught well regulated, and application of a fine water spray at convenient points, the length of flue where most of the fine white mass collected, could be materially reduced. In this connection, the claims of electric furnace operations should not be overlooked, but all associated features have also to be taken into account.

Electric smelting becomes more economical the higher the temperatures are required, and thus is exclusively utilized for chromium, tungsten and other high melting point metals. As previously pointed out, "the smelting of straight lead ores in the electric furnace has seemingly never been attempted either commercially or on a large experimental scale, largely because of the ease and cheapness of smelting such ores by combustion processes."

The treatment of complex sulphide ores and mattes, etc., belongs to a different category.

On account of the intense heat generated by the arc type of electric hearth, electric smelting furnaces are limited to the slag-resistance constructions. The operator benefits by a quiet heat with the slag-resistance type, with no blast, while the slag is in a molten condition beneath the charge. The ascending heat, instead of being dissipated through the roof, is absorbed in the descending ore charge, whereby the bulk of the heat supplied to the furnace is utilized in reduction or otherwise handling the charge.

What metallic values may be volatilized are condensed by the charge, whereby expensive outside devices for catching these values are eliminated. In view of the wide temperature possibilities, the slag may be so constituted that a strong refining action may be obtained as the fine particles of metal filter through the deep slag resistance on their way to the bottom to be tapped when a sufficient amount has been formed. Although electric current represents a costly item compared with combustible fuels, it has to be remembered that the actual efficiency of electric smelting hearths is vastly greater. With higher melting temperatures, crucible furnaces sometimes show an efficiency little more than three per cent, with reverberatories up to 15 per cent, although the regenerative type may exceed 30 per cent, and blast-furnaces showing little more than 50 per cent, whereas the electric smelting hearth is seldom as low as 60 per cent and more frequently attains up to 85 per cent efficiency. Although relating to higher temperature work, this gives a rough criterion of how widely divergent are the systems, and how, so far as actual efficiency is concerned, the electric system outclasses the others.

With comparatively easily fusible materials like many of the complex lead sulphide ores and mattes, the advantage of being enabled to ensure collection of volatile matter within the precincts of the hearth without the need for outside devices needs little in the way of emphasis, and more particularly so where the charge includes precious metal contents. When tin ores were first reduced in the electric furnace to give 0.25 per cent tin in the slags, the current expenditure amounted to 3.000 kWh. per ton. This was later improved to 1.140 kWh. per ton, of which 665 kWh. was consumed in actual reduction, with 130 kWh. for melting the slag, 65 kWh. for heating the charge with 150 kWh. heat in the gases, and a radiation loss of 130 kWh. More recently, this has been reduced to 450 kWh. per ton, although the tin in the slags amounted to 0.5 per cent, which is deemed high in view of the prevailing high tin price.

With complex lead ores and mattes, the varying range of constituents where either the lead, copper or iron contents may fluctuate from 20 to 40 per cent, makes it impossible to forecast current consumption figures. The use of the top section of the charge as a "blanket" represents a method unknown to alternative procedures, since no tight packing is permissible with any of the blast systems of working, while the absence of air-flow prevents dissipation of the volatile constituents. The total volume of gases liberated is trifling compared with almost any class of fuel-fired furnace. Where products rich in precious metals were smelted in the latter hearths, the fume was known to contain up to 20 oz. of gold per ton, and from 800 to 1,400 oz. per ton of silver. This material was allowed to accumulate in a collecting system, and periodically smelted at the rate of some ten tons per week in reverberatories, where the lead again volatilized and passed to some extent round the system.

BEHAVIOUR OF LEAD UNDER DIFFERENT CONDITIONS

More than a century ago, lead was used as a medium for picking up precious metals, and the antiquity of the procedure compared with the advances made elsewhere need not be repeated. Lead is only a nuisance and involves the need for various furnace treatments which are merely expended on reverberatories, cupellation hearths and other furnaces to accommodate this time-worn arrangement, while the by-products are numerous and varied, none serve any useful purpose, not to mention the danger of lead poisoning. The perseverance of such procedures can only be attributed to a lack of enterprise, and the ease of sitting-down on an established routine.

The electric smelting furnace can be engaged to reduce out metals, and it materially reduces volatilization to the absolute minimum, but, of course, requires special construction for the purpose. Large hearths for dealing with complex ores have attained capacities of 150 tons per 24 hours. These are, however, connected to chambers for the expansion of gases and dust collection for that small percentage of volatile matter which does make egress.

As automatic controls are fitted to the electrodes, very little attention is necessary except to charge and tap, while the charging is facilitated by an alarm which rings when the furnace requires feeding. As pointed out previously, mattes can be made to contain more than 40 per cent lead by dint of manipulating the charge, and it is not actually necessary to allow the charge to run to the extent of producing excessive metallic lead. On the other hand, there are several methods of eliminating the lead content where it is not wanted. Leaving aside electric hearths, converters have been so designed that with material containing 20 per cent lead, 36 per cent copper and 10 per cent zinc, it is possible to eliminate 90 per cent of the lead content as has been described previously. The charge can also be worked in the opposite direction and retaining the lead temporarily within the matte, by so working that it becomes eventually ejected from the latter in metallic condition. Where the liquid sulphides are allowed to collect in a bath, air is blown through at a pressure of 15 lb. per sq. in., delivered through a cross-piece connected to two pipes immersed in the red-hot mass. What then happens is that the lead becomes partially oxidized, and the oxide reacts with the sulphide, whereby sulphur dioxide is disengaged and metallic lead separates out. This method has been worked out as a non-matte forming system, thereby eliminating the need for roasting where the product is wanted in metallic condition. There are various ramifications of these methods, such as cutting off the blast as the fresh sulphide layer develops, etc. One of the earlier furnaces for reducing lead ores and subjecting to air-blowing is quoted as consuming some seven tons of coke, and handling up to 80 tons of ore and fluxes per day. The latest electric smelting hearths are better by far than the fuel-fired furnaces as they make it possible to alter the temperature and conditions at a moment's notice, and to keep the temperature within the closest possible tolerances—a feature which was unknown in earlier years.

SEPARATING PLATINUM METALS FROM *RICH LEADS*

Flue dusts have been known to contain from 16 to 26 per cent of lead oxide, and on occasion this has reached 45 per cent. The ordinary procedure is to have this mixed with litharge and smelted by the usual reaction between oxide and sulphate of lead, *i.e.*, with suitable additions of coal to reduce the sulphate to sulphide condition. By the early system of using lead as a picking-up agent for precious metals, this meant that far from getting rid of a poisonous and otherwise undesirable material, it was always retained. To make matters worse, arsenical lead was preferred because of the so-called ease of collecting iridium, rhodium, osmium and ruthenium, and the use of which could only be described as antiquated to a degree. The platinum metals in general are not difficult to separate from the base metals, as their reactions differ quite materially, and the presence of lead and arsenic was entirely unnecessary. Lead was supposed to be an essential for collecting gold, platinum and palladium, while silver mainly passed into the matte, and the arsenic caused a form of white-metal or speiss-matte to be produced which, on skimming from the lead, collected these iridium metals. With no means of checking or even controlling the emission of lead and arsenic, these were allowed to pass round and round the process until eventually so much lead had accumulated that it had, of necessity, to be got rid of by means of the Parkes system. (The same Parkes process could have been taken advantage of daily to get rid of lead without allowing it to pass around the system at all.)

It was presumed that a quick return was obtained for the gold content, a point of no small importance in view of the fact that rich lead could contain as much as from 240 to 300 oz. of gold per ton.

Even this, the only possible claim in favour of the antiquated lead collecting system was in doubt, whereas all the platinum metals without exception were allowed to become dissipated to a variety of different products in the most indiscriminate manner, and necessitated lengthy treatment before they were eventually fully recovered, many weeks after the time, *i.e.*, frequently after the market price had fluctuated several times. A more general appreciation of modern smelting conditions would have revealed only too clearly that there was no need for making direct additions of lead and arsenic with all the extra work their subsequent removal entailed.

REVIEWS

Coal-Mining.—*By I. C. F. Statham.* 1951, *London: English Universities Press, Ltd. Pp.* x + 564; *Figs.* 310. 5¾ x 9 *in. Price* 22*s.* 6*d. net.*

This book by the Professor of Mining, University of Sheffield, has been specially designed to cover the needs of new entrants into the mining industry and special emphasis has, therefore, been laid on the practical nature of the work involved. As far as possible, mathematical problems have been excluded and replaced by descriptive passages, which incorporate the basic theory and illustrate the practical application of the theory. The value of this well-produced book, which has been written with the full co-operation of the Ministry of Fuel and Power, is greatly enhanced by many illustrations which have been carefully chosen to show the latest developments in mining technique and machinery.

Sutcliffe Industrial Conveying Pamphlets

A set of five new Industrial Conveying pamphlets, has just been issued by Richard Sutcliffe Ltd., Universal Works, Horbury, Wakefield, Yorks.

These attractively produced, illustrated pamphlets, contain both general information and technical details which combine to make a useful publication for all those interested in the mechanization of industry.

The first pamphlet in this series deals with Industrial Conveyors and gives the essence of the company's experience of over fifty years' in the field of belt conveying. Of special interest to readers of *The Mining Journal* are Industrial Conveying pamphlets *No. 2* and *No. 3*, devoted, respectively, to Coal, Coke and Ore Handling, and to Mechanical Handling in Quarries and Sand and Gravel Pits.

"Chemical and Processing Industries" and "General Mechanical Handling in Industry" are the titles of the last two pamphlets in this most useful series.

Colonial Geology and Mineral Resources.—*H.M.S.O. Price* 5*s. net.*

The *Quarterly Bulletin* of the Colonial Geological Surveys contains, in No. 2, Vol. 1, a paper on the Geological Features of Northern Rhodesia, accompanied by illustrations and a geological map. Reports from several Geological Surveys, including those of the Gold Coast, Tanganyika, Borneo and British Guiana. Book Reviews and Bibliography, round the issue off.

Machinery & Equipment

The Smith "Super Ten" and "21" Excavators

The Smith "Super Ten" Excavator, made by Thomas Smith & Sons (Rodley) Ltd., Rodley, Leeds, is a 10 cu. ft. machine, designed with a view to greater output and mobility with less maintenance and longer periods between overhauls than earlier models. The revolving superstructure incorporates liberal use of ball and roller bearings, coupled with total enclosure and oil flow lubrication, resulting in reduced friction and little maintenance being required. Three hook rollers are also provided, which resist the action of the digging loads on the carriage.

The carriage is designed to meet the ever increasing demand for greater mobility and higher travelling speed. It is a one-piece all-welded fabricated structure, designed to take all the superstructure loads and the enormous twisting caused by working on uneven ground.

The three-cylinder high-powered Diesel engine provides ample power to meet all requirements and is fitted with self-starter equipment. The complete steel cab, with wide

The Smith "Super Ten" Excavator

range of vision for the driver, encloses all superstructure, machinery and engine and also provides plenty of room for the driver. Only two jibs are required for all attachments, one for navvy shovel, skimmer scoop and dragshovel, and the other for dragline, crane, grab crane and pile driver. Crowding gear is fitted as standard with the navvy shovel, and only one bucket is required for skimmer and dragshovel.

As regards the Smith "21" excavator, the company has recently announced that further developments of this ¾ cu. yd. machine have now been made, adding to the existing fine performance of this Smith product. Among its many improvements is the transmission between engine and machinery, comprising the new type two-speed gearbox designed for quieter running. This, and the Triplex roller chain drive, are all totally enclosed in oil-tight cases. Drive from engine to gearbox is the new type flexible coupling, providing a cushioned drive and absorbing any movement between engine and gearbox. Ballbearing races on many of the main revolving shafts have replaced the original brass bearings, thus increasing the life of the bearings.

Power for travel and slewing is smoothly transmitted by large flat plate friction clutches and machine-cut bevelled gears. These clutches are easily re-lined and can be quickly adjusted with the centralized control device provided.

An all electrically welded superstructure is a fully revolving balanced unit rotating on a large diameter live ring of rollers. Three hook rollers are provided to reduce the reaction of the digging loads on the carriage frame.

Ample power to meet all requirements is provided by a 72 b.h.p. Diesel engine. All engines are fitted with electric starter equipment.

The whole of the machinery and engine is completely enclosed by a new steel cab of pleasing design, which gives better vision and protection for the driver.

The carriage, which is also electrically welded, is of sturdy and robust construction. It has ample ground clearance and, together with the liberal area of crawler tracks, allows excellent mobility under all conditions. Final driving axles are provided with totally enclosed bearings, eliminating unnecessary wear.

Two short jibs only are required, one for crowd shovel and the second for either skimmer or trencher. Both are of box section construction. The twin racking arms for rope or chain crowd navvy are of the outside type, holding the bucket well up to its work. The standard jib for dragline, crane, grab crane or pile driver is of the steel tubular type, giving maximum strength with minimum weight. The jib is in two sections with provision for inserting centre sections when longer jibs are required. All buckets are of fabricated steel construction, incorporating a special alloy steel lip plate to resist wear, and are fitted with four alloy steel forgeable teeth.

Danish Equipment for Radio-active Research

Various types of meters for radio-active research have been made in Denmark in recent years, states an article by Dr. Techn. Per W. Brüel, published in the *Danish Foreign Office Journal* (No. 4, 1950). The most popular is an amplifier to which two Geiger-Müller tubes can be coupled. Two built-in high-tension units provide the voltage. In addition, two sets of scaling circuits are fitted, which can be adjusted for dividing the number of radio-active particles received by two, four and eight, respectively. The principle is the same as that employed in the large electronic calculators, which can perform 10,000 calculating operations in less than a second. The scaler stages are followed by two mechanical meters which register the number of impulses. For measuring very powerful radio-active specimens, all the scalers can be series-connected.

This is claimed to be the only commercially produced G-M amplifier in the world with this dual device. It is stated to be exceptionally sensitive, thus making it possible to work with very small G-M tubes. The apparatus is furnished with equipment of various kinds, including lead blocks into which G-M tubes and specimens can be inserted. The lead, which is 3 cm. thick, shields the G-M tube from extraneous radio-active rays and reduces the effect of cosmic rays on the measuring result.

The counting-rate meter is described as an entirely new apparatus; this is not fitted with scaling circuits, but the number of impulses per minute can be read directly on a scale. The maximum number of impulses that can be read on this instrument is 30,000 per minute, and the minimum about 30. For demonstration and control a small loud-speaker has been fitted, which gives a crack each time a particle enters the G-M tube. It is possible to couple recording apparatus to the instrument to record on a paper strip the activity as a function of time.

The third apparatus in this category is a quite small portable G-M instrument, battery-driven, with the G-M tube built in. Indication is by telephone. The whole apparatus weighs only a kilo, and is completely watertight, being intended for use in the field in testing soil for radio-activity.

Metals, Minerals and Alloys

While the tightness in the non-ferrous metals shows no relaxation, a rather more hopeful tone is observable in top-level quarters regarding allocations of supplies in the future and give-and-take between the principal consuming countries of the Western Powers group. Mr. Charles Wilson, U.S. Director of Defence Mobilization, since his return to Washington at the end of last week has told the Senate that while British ministers were determined to do their full share in production for defence they needed help, and the United States had to help them. It was indicated also that efforts would be made to short-circuit the discussions in the International Materials Conference which cannot help but be protracted, as we suggested would be the case when the organization was first broached. This week, Mr. Stokes, Lord Privy Seal, is sailing to the United States to discuss supplies of scarce commodities at first hand in response to Mr. Wilson's suggestion when here, that such a visit might be desirable.

In the United States the Controlled Materials Plan is beginning to take form with the issue of two regulations establishing the basic pattern of its operations, the first stage being the compilation of forms by manufacturers stating their requirements during the third quarter of the year. The plan does not become fully operative until July 1. Obviously the complexities caused by this attempt to regulate supplies will be serious.

The Governments of Great Britain and France have told the United Nations Sanctions Committee that their Governments will probably accept an American plan to impose an embargo on the shipments of strategic goods to Communist China. A vote on the eight-point resolution in the General Assembly is expected next week.

The Western Allies have announced the lifting of control on German activities in the field of electronics, chemicals and metals related to the production of atomic energy.

Copper.—The U.S. Department of State announced on Monday night that Chile has agreed to expand her copper output, increase supplies to the U.S. and deny them to the Soviet Union and satellite countries. The U.S. Government has accepted an increase of 3c. per lb. for Chile copper sold in the U.S., raising the price to 27½c. and it is understood that prices to other countries would not be below this figure. The U.S. will not give financial assistance to American companies operating in Chile, but will grant equipment priority to increase production. With this advance in the price of Chile copper which, of course, applies to this country also, Northern Rhodesian copper, which is at present sold to the Ministry of Supply at the price based on the "official" domestic U.S. figure of 24½c., has a strong claim for similar benefit. Whether this advance in price, which will probably be reflected in imports to the U.S. generally, will help to reduce black market operations which, according to the chairman of the Chrysler Corporation, are "mushrooming through the country," seems open to doubt. He declared that buyers and sellers alike are ignoring Federal price controls to the extent that deals for copper, lead, zinc and nickel are being made at over 100 per cent above the quoted market values. This evasion may be overcome, or at least lessened, if the C.M.P. works effectively.

U.S. domestic bookings for April are reported as around 108,000 s.tons with 63,000 s.tons contracted for May. Northern Rhodesian output in February is reported at 21,462 tons which, with 23,681 tons in January, gives the total output for the first two months of 45,143 tons.

Efforts to obtain Government support for financing the White Pine property of the Copper Range Co., in Michigan, are continuing with a reputed target of 37,500 s.tons of copper; production to start in about 2½ years.

The president of the Kennecott Copper Corporation has given the company's output in the first quarter of the year at approximately 148,000 s.tons and for the whole of last year at 576,000 s.tons.

The Northern Rhodesian Mineworkers' Union, representing the white mining and engineering staff, failed to report for work on Monday, thus bringing mining and milling operations to a standstill. Mine officials and staff as well as the native employees reported as usual.

A further cut in the use of copper and its alloys has been announced by the French Ministry of Industry and Commerce. This imposes a quota of 6,000 tonnes a month after July 1, next. A cut in February had reduced the allocations from 10,000 tonnes to 8,500 tonnes. French copper requirements in normal times are given as 10,000/12,000 tonnes a month.

Lead.—Despite the cutbacks in civilian consumption in the United States to the level of the first half of 1950, the emission of an increasing number of defence orders and a heavy decline in imports is increasing the anxiety of the U.S. consumers. All domestic May shipments have been completely allocated and nothing more can be done until the June delivery books are open.

Regular shipments are now being made from Tanganyika. The February export was 527 tons of concentrates.

Tin.—Tin has been a quiet market this week. The R.F.C. has maintained its price for Grade A tin at 142c. per lb. The Straits price eased over the week-end. Latest prices will be found in our Metal Market report below. Exports from the Straits in April were 5,329 tons (5,988 tons in March) of which Europe took 2,702 tons, the U.K. 1,138 tons, British Possessions 1,125 tons and other countries 364 tons. Shipments to the United States, which totalled 130 tons in March, ceased altogether last month. The output of the Texas smelter in April was 3,058 tons, bringing the four months' total to 12,401 tons (10,202 for the same period of 1950); the output in the last three months hardly varied. The Bolivian elections were held this week both for the President and the Legislature. Señor Victor Estensoro, leader of the National Revolutionary movement, now an exile in Argentina, seems likely to head the poll. He was reported to have been associated with the recent abortive plot to upset Señor M. Urriolagoitia's Government.

The British Government has begun compensation payments for damage to life and property in Thailand out of the payments received from the Thailand Government. Commonwealth tin interests are to receive £2,049,000, of which about three-quarters go to British and one-quarter to Australian interests.

Zinc.—The scarcity of zinc in the U.S. is, if anything, intensified, with consumers seeking to purchase foreign material at 45c. or higher f.o.b. foreign shipping ports. Canadian stocks have increased owing to a decline in exports, due possibly to expectations of a higher price. Rhodesia Broken Hill output in April is reported at 1,900 tons.

Rouyn-Noranda Press reports that the U.S. Government will probably advance $12,000,000 to $18,000,000 to construct a zinc smelter in Eastern Canada.

Aluminium.—U.S. aluminium output continues to increase, the March figure reaching 70,000 s.tons, with shipments to primary producers in excess of production. Stocks have fallen to 12,048 s.tons, the lowest figure since September.

The Greek reconstruction programme for 1951/2 contemplates the establishment of an aluminium industry as well as the production of nitrogen and soda. Bauxite deposits in the Eleusis and Stylis districts are to be opened up. The plants may, it is hoped, be completed some time in 1953/4.

Antimony.—Reuter reports from Johannesburg that in the last quarter of 1950 Consolidated Murchison Goldfields and Development Co. exported 5,208 s.tons of 60 per cent concentrates, including a small portion to Australia.

Beryllium.—President Perón has told an assembly of miners that the State will invest P.700,000,000 in prospecting for new mineral deposits. He claimed that the country was now exporting beryllium by the ton, and that Argentina possessed the mineral in abundance.

Manganese.—It was stated in the Indian Parliament this week that India aims at exporting 1,000,000 tons of manganese in the current year together with an unlimited quantity of low-grade ore. Most of the exports are to go to the United States. The chairman of the U.S. Munitions Board, Mr. John Small, stated that the Administration is seeking authority to make long-term guaranteed purchase contracts with foreign producers, particularly for manganese, tungsten and cobalt.

Nickel.—The world shortage of nickel has caused the N.P.A. to instruct INCO not to furnish more than 60 per cent of the nickel required in any D.O. during the current month, and to supply civilian consumers with only 15 per cent of their consumption rate in the first half of 1950. Sherritt-Gordon mines announced this week that they will spend $C.28,318,000 on developing their nickel-copper property at Lynn Lake, Manitoba. Included in the programme, which is to be completed in 1954, will be a nickel refinery in Alberta, with a capacity of 8,500 s.tons of nickel, 4,500 tons of copper, 300,000 lb. of cobalt and 70,000 tons of sulphate of ammonia. Thus the new scheme provides for a completely integrated operation. Workers and their families will be moved *en bloc* from Sherridon, 120 miles north to the new site of operations. This announcement follows the defeat of the Social Credit Party's efforts to increase sales and excise taxes in the Canadian House of Commons, and to impose a capital gains tax.

The discoveries of nickel and chrome deposits made in the Cyclops Mountains of Western New Guinea in 1948 are to be investigated.

Titanium.—Mr. Charles Cox, president of the Kennecott Copper Corporation, stated recently that the first of the five furnaces at Sorel for treating the Allard Lake ores was completed late last year and shut down for repairs but should be in commission again shortly. The construction of a second furnace is on the way, and a start made on the foundations of the remaining three. There is still a pressing demand for titanium-bearing slag for conversion into TiO_2 and titanium metal, much greater, in fact, than was anticipated.

Tungsten.—The wolfram market is steady but quiet and not much business passing, though there seems to be rather more interest displayed by buyers of wolfram during the last day or two. A number of purchasers both in this country and on the Continent have been holding off owing to the uncertainty of what was going to happen regarding the price paid by the U.S. We call the price in the region of 515/525s., c.i.f.

The price of tungsten powder has been advanced in the United States to $6 from $4.15 per lb.

Platinum.—It is reported that a refinery to treat some of the platiniferous ores of the Transvaal is to be established in South Africa under arrangement between Messrs. Johnson Matthey and the Rustenburg Platinum Mines. Production from the Union Platinum Mining Co.'s properties is to be increased to bring the total output of platinum metals to over 300,000 oz. a year.

Silver.—Messrs. Handy and Harman, the well-known silver dealers, report a net income for the first three months of the year of $543,057 as compared with $1,079,457 for the whole of last year. The company is a major supplier of silver, brazing alloys, silver solder, gold solder, dental gold, as well as silver and gold for general use; it also fabricates silver in sheet and strip form.

The London Metal Market

The only feature in the tin market during the last week has been the fairly substantial amount of cash tin available, which has been so readily absorbed that the backwardation has tended to increase rather than diminish. Home and Continental demand continues quiet, but a little more business has been done than recently. In America users are buying tin from the R.F.C., but appear to be in no hurry to cover their total allocations—it is interesting to note that the April shipments of tin from Malaya showed that the flow of metal to the States had stopped.

In the "free" market the demand for copper has continued, and availability is now more important than price, but it is hoped that the 20 per cent of the Chilean production which can now be sold outside the United States will do something to help the position. Lead is a fairly firm market at around £210 per ton, whilst g.o.b. zinc is firmer at £315-£325 per ton for third quarter delivery.

On Thursday the official close on the tin market was: Settlement price £1,140, Cash Buyers £1,135, Sellers £1,140; Three months' Buyers £1,120, Sellers £1,130. In the afternoon the market was easy. Turnover for the day was 160 tons. Approximate turnover for the week was 710 tons.

The Eastern price on Thursday morning was equivalent to £1,149 2s. 6d. per ton c.i.f. Europe.

Iron and Steel

The steel using industries experience growing difficulties in obtaining supplies adequate to sustain full activity. Restrictions upon the use of alloy steels are most severe but delivery dates for nearly all classes of steel products have been lengthened to such an extent that industry is now more or less reconciled to the prospect of the reimposition of some system of controlled distribution. This is a matter still under discussion, and an early decision is anticipated.

A revision of the schedules of maximum prices is also overdue, since the iron and steel makers are now saddled with the extra financial burdens entailed by the increases in railway rates and foreign ore freights.

The most serious difficulty confronting the steel makers is the continued shortage of raw materials. How serious the position has become, may be briefly indicated. In the six months ended in March last stocks of foreign ore in the U.K. are estimated to have fallen by 50 per cent. Stocks of scrap at the steel works fell from 618,000 tons to 408,000 tons between January 1 and March 31 and in the same period pig iron stocks were reduced to 319,000 tons a fall of 153,000 tons.

Inevitably, production of iron and steel has been adversely affected, and the more vigorous measures now being taken to improve the position are long overdue. It is highly improbable that the home scrap drive will yield an extra 1,000,000 tons this year, which is the estimated extent of the shrinkage in imports of scrap from Germany and other

foreign sources, but at least it should narrow the gap.

The position in relation to foreign ore supplies is more hopeful. It is learnt that B.I.S.C.O.R. (British Iron & Steel Corporation Ore) has bought 8,600,000 tons of ore from Sweden, Spain, North and West Africa and Newfoundland and the problem is now reduced to the movement of this vast bulk of material

Ore carriers are scarce and ore freights are about thrice the rates ruling a year ago. However, an approach has been made by the Minister of Transport to British shipowners to speed up the shipment of iron ore to U.K. ports and other means of dealing with delays in the ports are under review.

Thus it is hoped that the decline in iron and steel production may be arrested. Deliveries, however, are falling into arrears, demand far exceeds the supply, and it is now widely believed that the re-introduction of a system of allocations, which is now under discussion, may be the only safeguard against a break down in the continuity of supplies to essential users.

It may also be recalled that steel prices have not been reviewed since railway rates were advanced and when the new price lists are issued, some cognisance may also be taken of the steep rise in ore freights.

MAY 10 PRICES

COPPER

Electrolytic	£210 0 0 d/d

TIN

(See Metal Notes above for Thursday's Metal Exchange prices)

LEAD

Soft foreign, duty paid	£160 0 0 d/d
Soft empire, including secondary lead	£160 0 0 d/d
English lead	£161 10 0 d/d

ZINC

G.O.B. spelter, foreign, duty paid	£160 0 0 d/d
G.O.B. spelter, domestic	£160 0 0 d/d
Electrolytic and refined zinc	£164 0 0 d/d

ANTIMONY

English (99%) delivered, 10 cwt. and over	£390 per ton
Crude, (70%)	£305 per ton

NICKEL

99.5% (home trade)	£406 per ton

OTHER METALS

Aluminium, £124 per ton.	Palladium (scrap), £8 oz.
Bismuth, 22s. 6d. lb.	Platinum, £27/£33 5s. nom.
Cadmium, 18s. 3d. lb.	Rhodium, £45 oz.
Chromium, 5s. 3d. lb.	Ruthenium, £30 oz.
Cobalt, 15s. 6d. lb.	Quicksilver, £73 10s./£74 ex-warehouse.
Gold, 248s. f.oz.	Selenium, 25s. nom. per lb.
Iridium, £65 oz. nom.	Silver (bar), 78¼d. f.oz. spot and forward.
Magnesium, 1s. 6d. - 2s. lb. according to quantity.	Tellurium, 19s. lb.
Osmiridium, £35 oz. nom.	
Osmium, £70 oz. nom.	
Palladium, £8 10s. oz.	

May 10 Prices—continued

ORES, ALLOYS, ETC.

Bismuth	65% 15s. 9d. lb. c.i.f. 60% 15s.
Chrome Ore—	
Rhodesian Metallurgical (lumpy)	£11 per ton c.i.f.
„ „ (concentrates)	£11 per ton c.i.f.
„ „ Refractory	£10 12s. per ton c.i.f.
Baluchistan Metallurgical	£11 11s. per ton c.i.f.
Magnesite, ground calcined	£26 - £27 d/d
Magnesite, Raw	£10 - £11 d/d
Manganese, Best Indian	(Nominal)
Molybdenite (85% basis)	(Nominal)
Wolfram (65%), U.K.	515s./525s. c.i.f. nom.
Tungsten Metal Powder (for steel manufacture)	33s. 6d. nom. per lb. (home)
Ferro-tungsten	31s. 6d. nom. per lb. (home)
Carbide, 4-cwt. lots	£30 3s. 9 d/d per ton
Ferro-manganese, home	£36 1s. 1d. per ton
Ferro-manganese, export	Nom.
Brass Wire	2s. 4¾d.
Brass Tubes, solid drawn	1s. 10¾d.

OBITUARY

DAVID EVANS

The death occurred at his home in Cardiff on April 24 of Mr. David Evans, former editor of the *South Wales Journal of Commerce* and one of the foremost industrial and commercial journalists in the country. He was 76 years of age. Mr. Evans had a seizure in the early evening after working in his garden and died a few hours later.

David Evans was a native of Swansea and began his career in a steel works where his father was employed. He stayed there only a few weeks however and found a job with the now defunct *Cambrian Daily Leader*. For some years he worked in turn on the three Swansea papers of the day. Shortly after his death of his father at a comparatively early age David, the eldest of eight children came to Cardiff where he joined the *South Wales Daily News* as Docks correspondent. Later he became editor of the *South Wales Journal of Commerce* now dead. For many years he was closely associated with the late Lord Rhondda of whom he wrote a short memoir. Mr. Evans was the author of "Labour Strife in the South Wales Coalfield, 1910-11" and co-author of several other books concerning coal. He was also for many years the South Wales correspondent of *The Mining Journal*.

His knowledge of coal and shipping in South Wales was unrivalled and he took a prominent part in the great controversies between the miners and the coal owners.

The funeral took place on Saturday, April 28 and was attended by a representative gathering from the industrial commercial and journalistic life of South Wales. They included Mr. John Griffiths, past chairman of the South Wales Coalowners' Association, Mr. D. R. Prosser, editor of the *Western Mail* and Mr. Iestyn R. Williams, director-general of Labour Relations, National Coal Board.

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The Mining Markets

(By Our Stock Exchange Correspondent)

Copper shares had a good week, all the leading issues showing substantial gains. Dividend anticipations, coupled with hopes of a higher price for the metal, brought in substantial buying. Unofficial reports suggest that a rise in price of the metal from 24½ to 27½c. per lb. is embodied in the Chilean-United States copper agreement.

Rand shares, where changed, were mostly better, preference being shown for the issues of some of the leading finance houses. Among individual mines New Pioneer and Van Dyk were outstanding. Buyers appeared for the shares of the former company, both in London and the Cape, following rumours concerning the raising of fresh capital and hopes of further flotations sponsored by the group. Fresh developments are considered unlikely before the autumn. Van Dyk were better on unofficial reports of promising results from the new shaft in the direction of East Rand Proprietary.

Orange Free State issues have attracted the most attention in the Kaffir market; led by Geoffries most of the leading developers have recorded satisfactory gains on the week. The full details of the RD1 borehole, disclose two major reef bands at depth of 5,220 ft. and 5,235 ft., the latter returning a value of 1,439 in.-dwt. These results are important to Geoffries and Middle Wits, and the shares of both companies responded accordingly. The borehole is on farm Rosedale 898, and is approximately 7,000 ft. south of VDH1.

West African shares displayed a firmer tendency earlier in the week, but later eased off on lack of interest. Even the announcement by Ashanti that the reef had been intersected at the 35° level failed to stir the market from its sluggishness. This special announcement is important, as it confirms the continuation of the reef at the bottom of the mine. No details have yet been announced, but market circles anticipate good results from the fact that a special report has been issued by the company. Dealers in this market hope that the promised review of mine taxation on the Coast will not be long delayed, as such a move is already overdue.

Tin shares were generally friendless. This is usually rather a one-way market, all buyers or all sellers. Last week continued small offerings, and the absence of any buyers caused the shares to finish at lower levels. Beralt were a bright spot, encouraged by the enhanced price of wolfram, now at 510/525s. per unit, and by the second interim dividend of 25 per cent recently declared. This makes a total of 40 per cent paid so far this year, against a single annual distribution of 20 per cent last year. The chairman of London & African Mining Trust reported that agreement had been reached over the lease terms for the Nigerian lead/zinc project. Details can be expected after the proposals have been approved by the Nigerian Legislative Assembly. American Smelting is interested in this venture. Consolidated Zinc remained unchanged at 38s. The directors are recommending a final dividend of 1s. 10½d. make a total distribution of 2s. 6d. a share for 1950.

New Broken Hill are maintaining their dividend unchanged with a final of 20 per cent making 30 per cent for the year. Profits before taxation were up from £693,014 to £930,941. The result disappointed the market and the shares eased 2s.

San Francisco Mines proved the star turn in this section, with an annual dividend of 70 per cent. This compares with 50 per cent last year, and is the sixth successive year in which the distribution has been increased.

Oils were cheerful and good week-end press references brought in speculative buying of Ultramar.

FINANCE	Price May 9	+ or on week
African & European	3⅜	
Anglo American Corpn.	8⅝	+ ⅛
Anglo-French	23/9	
Anglo Transvaal Consol	43/9	+1/10½
Camp Bird	14/6	
Central Mining (£1 shrs.)	48/1½	
Consolidated Goldfields	2⅜	
Consol. Mines Selection	38/1½	+1/10½
East Rand Consols	15/-	+1½d
General Mining	6⅝	+⅛
H.E. Prop.	41/10½	+7½d
Henderson's Transvaal	10/9	
Johnnies	3¼	+ ⅛
Rand Mines	7⅛	
Rand Selection	43/9	
Union Corporation	11⅞	+ ⅛
Vereeniging Estates	6½	
Writs	35/6	−1½d
West Wits	2⅛	− ⅛
RAND GOLD		
Blyvoors	52/6	
Brakpan	22/-	−3d
City Deep	3⅛	
Consol. Main Reef	2⅞	+ ⅛
Crown	7	− ⅛
Daggas	4⅛	
Dominion Reefs	3⅛	+ ⅛
Doornfontein	2/3	+3d
Durban Deep	27/6	
E. Daggas	4⅛	
E. Geduld ... (4/- units)	28/1½	−7½d
E. Rand Props.	2⅝	− ⅛
Geduld	4⅛	− ⅛
Grootvlei	8⅛	
Libanon	43/1½	
Luipaards Vlei	17/9	
Marievale	25/3	
Modderfontein B	23/6	−3d
Modderfontein East	6/6	
New Kleinfontein	2⅛	
New Pioneer	36/3	
Randfontein	29/4½	+3/1½
Robinson Deep	21/3	
Rose Deep	18/3	−3d
Simmer & Jack	42/6	
Springs	7/6	
Sub Nigel	12/3	
Van Dyk	3½	
Venterspost	18/6	+1/3
Vlakfontein	32/6	
Vogelstruisbult	22/3	
West Driefontein	26/9	
W. Rand Consolidated	6⅛	
Western Reefs	46/10½	−7½d
	42/6	

O.F.S.	Price May 9	+ or − on week
Alpha F.S.A.	16/3	+1/6
Blinkpoort	26/10½	+1/3
Central Mining F.S.	5/6	
Freddies	19/9	+1/3
Freddies N.	12/6	+1/3
Freddies S.	13/9	+1/3
F.S. Geduld	3½	−⅛
Geoffries	36/9	+5/6
Harmony	25/6	
Lydenburg Estates	12/6	
Middle Wits	28/3	+2/9
Ofsits	2⅜	+⅛
President Brand	25/6	
President Steyn	13/6	+6d
St. Helena	35/7½	
T.F.S.C. & G.	10/6	−3d
Virginia Deb.	77	
Virginia Ord.	16/1½	+9d
Welkom	42/6	−6½d
Western Holdings	3⅞	−⅛
WEST AFRICAN GOLD		
Amalgamated Banket	2/10½	+3d
Ariston	8/1½	+1½d
Ashanti	31/6	+3d.
Bibiani	12/4½	−3d
Bremang	4/-	+1½d
G.C. Main Reef	4/1½	
G.C. Selection Trust	11/6	+3d
Konongo	2/6xd	−1½d
Kwahu	5/-	−3d
London & African Mng.	2/10½	−3d
Lyndhurst Deep	1/3	
Marlu	3/3	+1½d
Nanwa	1/1½	
Taquah & Abosso	8/3	+3d
AUSTRALIAN GOLD		
Boulder Perseverance	3/3	+3d
Gold Mines of Kalgoorlie	16/10½	+1½d
Great Boulder Prop.	7/-xd	+1½d
Great Western Consol.	2/-	
Lake View and Star	21/3	−9d
Mount Morgan	21/3	−1/-
North Kalgurli	18/6	
Paringa	9d	
Sons of Gwalia	12/6	
South Kalgurli	10/3	−3d
Western Mining	8/1½	−1½d
Wiluna	11/6	−3d
MISCELLANEOUS GOLD		
Cam and Motor	39/4½	+1/3
Champion Reef	10/9	−6d
Falcon Mines	12/9	−1½d
Globe & Phoenix	25/9	−3d

MISCELLANEOUS GOLD (contd)	Price May 9	+ or − on week
G.F. Rhodesian	10/3	+6d
London & Rhodesian	5/10½	
Metapa	4/1½	+3d
Mysore	6/3	
New Guinea	1/6	−3d
Nundydroog	9/3	
Ooregum	4/-	−3d
Oroville	13/9	−3d
De John d'El Rey	37/6	
Zams	35/9	+9d
DIAMONDS		
Anglo American Inv.	4½	+ ½
Casts	41/3	+1/6
Cons. Diam. of S.W.A.	3⅞	+ ½
De Beers Defd. Bearer	63/-	+1½
De Beers Pfd. Bearer	18⅛	+ ⅛
COPPER		
Chartered	75/6	+3/6
Indian Copper	8/4½	+1½d
Messina	5⅜	+ ⅛
Nchanga	8	+ ⅛
Rhod. Anglo-American	67/3xd	+4/-
Rhodesian Selection	42/6xd	+1/3
Rhokana	23xd	+1
Rio Tinto	26	+ ⅛
Roan Antelope	23/1½	+1/1½
Selection Trust	53/9	+7½d
Tanks	47/9	
Tharsis Sulphur Br.	57/6xd	+2/6
TIN (Eastern)		
Anglo-Burma	3/6	−6d
Aver Hitam	28/3	+1½d
Bangrin	40/-	−1/3
Gopeng	13/9	−9d
Hongkong	13/1½	−1/3
Ipoh	32/-	−6d
Kamunting	14/4½	+1½d
Kepong Dredging	13/1½	
Kinta Tin Mines	17/6	
Kramat Pulai	4/9	
Malayan Dredging	25/-	−7½d
Pahang	16/9	−1½d
Pengkalen	10/3	
Petaling	12/10xd	−1½d
Rambutan	15/7½	−2/6
Siamese Tin	26/-	+2/6
Southern Kinta	14/-	−4½d
S. Malayan	28/-	−1/3
S. Tronoh	23/1½	−4½d
Sungei Kinta	20/3	−4½d
Tekka Taiping	11/-	−3d
Tronoh	30/6	−9d

TIN (Nigerian and Miscellaneous)	Price May 9	− or − on week
Amalgamated Tin	12/-	
Beralt Tin	26/9	+1/-
Bisichi	5/-	+4½d
British Tin Inv.	17/6	−6d
Ex-Lands Nigeria	8/-	
Geevor Tin	19/-	
Gold & Base Metal	4/1½	−1½d
Jantar Nigeria	7/6	−3d
Jos Tin Area	11/3	
Kaduna Prospectors	4/3	
Kaduna Syndicate	6/6	
London Tin	5/6	+1½d
Ribon Valley	1/6	
United Tin	3/3	+3d
SILVER, LEAD, ZINC		
Broken Hill South	61/-	−3d
Burma Corporation	4/-	−1½d
Consol. Zinc	38/-	
Lake George	29/3	−6d
Mining Trust	5/9	−1½d
Mount Isa	49/3	+2/3
New Broken Hill	29/6	−2/-
North Broken Hill	77/3	−1/6
Rhodesian Broken Hill	24/3	
San Francisco Mines	78/9	+3/9
Trepca	4/1½	
MISCELLANEOUS		
BASE METALS & COAL		
Amal. Collieries of S.A.	63/9	+3d
Associated Manganese	74/3	−3/3
Chinese Engineering	2/-	−3d
C.P. Manganese	58/6	−6d
Natal Navigation	5⅛	− ⅛
Wankie	24/6	+1/-
Witbank Colliery	4⅛	− ⅛
CANADIAN MINES		
Dome	$30·	−2
Hudson Bay Mining	$120	
International Nickel	$78½	−1
Mining Corpn. of Canada	£7	−½
Noranda	$155	−1
Quemont	£9⅛	−¼
OIL		
Anglo-Iranian	5⅝	+ ⅛
Apex	49/4½	+7½d
Attock	27/6	+7½d
Burmah	59/4½	+3/9
Canadian Eagle Bearer	38/3	+9d
Mexican Eagle	24/10½	+7½d
Shell	4⅝	− ⅛
Trinidad Leasehold	30/6	+9d
T.P.D.	35/9xd	+1/3
Ultramar	37/3	+2/6

Rand and O.F.S. March Quarterlies

A prominent feature in the March quarterly reports of the Rand gold producers was the effect of earnings on revenue from processed and semi-processed gold. These have been running at a rate equal to 40 per cent of the total Rand gold output and the extra profit therefrom is acting as a useful cushion against rising costs.

The aggregate of the additional premium revenue in the March quarter was £1,937,977. This compares with £839,810 in the previous three months and £534,100 in the September quarter last year. For the whole of 1950 the total was £2,123,547.

Most of the companies received much more from premium sales than they paid away in capital expenditure, but whether they will consider this addition as a capital increment or give shareholders the benefit, depends on the sales of gold during the current quarter. On present indications the premium sales look like being maintained at a sufficient level to make the June half-yearly dividend season a good one.

The steady rise in working costs has impinged on profits which, for the first three months of the current year, were lower than those made in the last three of 1950. For richer mines the decline is in the neighbourhood of four per cent, but with lower grade properties, the setback rises to over ten per cent.

There was little indication in the March quarterly reports of the effect of the additional burden from the new taxation formula. But the sliding scale system on which gold mining is taxed, has ensured that the Union Treasury has already taken a slice of the devaluation melon. The mines paid some £8,000,000 more in taxation in 1950 than in the previous year.

CENTRAL MINING—RAND MINES' GROUP

The further substantial improvement in payability at East Rand Proprietary from 59 to 72 per cent was an outstanding feature in the Central Mining group results last quarter. In the September period the percentage payability was only 45. The improvement has been mainly due to results obtained on the Composite and South reefs and the higher payability on the former encourages the belief that development is improving in the south-eastern section of the mine.

Of the other members, Blyvoor's 10,624 ft. of development was similar to that of the previous quarter, while the payability—97 per cent—of the 5,650 ft. sampled was the same, the in.-dwt. being 630 against 562. Less development was done by all the other mines excepting Modder East but pay percentage and values were satisfactory. Forty-nine per cent of the 14,790 ft. sampled by Crown Mines was payable, the value being 232 in.-dwt., while City Deep's payability of 48 per cent was the same as in the December quarter. Consolidated Main Reef's results were rather better: of the 10,961 ft. of development, 7,790 ft. were sampled, of which 47 per cent (against 45 per cent) proved payable of 228 against 213 in.-dwt.

Colour was given to New Modder's 1,201 ft. of development by the 43 per cent payability of the 830 ft. sampled; value 130 in.-dwt. A similar footage was sampled the previous quarter but the pay ratio was only 19 per cent and the in.-dwt. 120.

Durban Deep opened up 17,727 ft. (against 18,704 ft.) and of the 10,200 ft. sampled, which was similar to the previous month, pay percentage was rather less—64—and the in.-dwt. was 296 compared with 328. The remaining member of the group's Rand producers, Rose Deep, did less development, and of the 6,580 ft. sampled, 31 per cent against 39 was payable of 238 in.-dwt.

ANGLO AMERICAN CORPORATION

For the most part, development footage of the gold producers administered by Anglo American, made a consistent showing in the first three months of the current year. A greater payability was, however, returned by Brakpan and Daggafontein: the former's development was rather lower but the footage sampled of 14,130 was similar to that of the previous month, the pay percentage being up from 23 to 28, and the in.-dwt. from 437 to 524. Kimberley Reef results of both Daggafontein and East "Dagga" were satisfactory, and pay ratio in both cases was slightly higher than in the December period. Of the 7,465 ft. opened up by the latter, 6,065 ft. were sampled, giving a payability of 36 per cent against 33, the average value being 417 in.-dwt. against 472 in.-dwt.

A bright showing was again made by South African Land, on which property more development was done: the footage of new ground opened up being 20,205 against 19,721, while of the 13,900 ft. sampled, which was similar to the previous quarter, 43 per cent compared with 41, proved payable of 327 in.-dwt. The company's revenue from premium gold sales of £42,373 was more than twice that received in the December quarter, while profit of £235,295 was also larger.

Western Reef's payable footage was better, but it was offset by a decline in value. Although development of 18,955 ft. was lower, there was an increase in that sampled —9,575 ft.—of which 50 per cent was payable, the value being 426 in.-dwt. against 458 in.-dwt. previously.

The footage of Springs Mines on both the Main Reef Leader and Kimberley Reef was similar to that of the previous quarter. Of the 2,505 ft. sampled on the latter, only 14 per cent against 19 proved payable, the value dropping from 452 in.-dwt. to 270 in.-dwt.

CONSOLIDATED GOLD FIELDS

No definite news was forthcoming in the March quarterly of Doornfontein with regard to the correlation of the bottom band of the reef zone struck in the Annan shaft towards the end of last year. The Carbon Leader zone has been displaced upwards and more crosscutting than expected must be undertaken before the reef is intersected on the No. 5 level horizon from the Annan shaft. The crosscut towards the Carbon Leader zone at this level passed through faulted and disturbed ground containing fragments of uncorrelated reef.

The other Far Western Rand member of the Gold Fields group—West Driefontein—reported the first development results from the No. 2 shaft. On the 12 level, 375 ft. of reef were sampled, all of which was payable with an average value of 12.1 dwt. over 45 in. or 545 in.-dwt. This compares with 1,075 in.-dwt. in a short drive put out into the reef when initially cut in this shaft and 781 in.-dwt. from the development done via the No. 2 level drive extended into West "Dries" from the Blyvoor.

Of the group's producers, Libanon sampled 270 ft. on the Contact Reef, of which 33 per cent was payable, averaging 375 in.-dwt. Robinson Deep reported that operations continue to be hampered by a shortage of labour and by pressure bursts. Sub Nigel's percentage payability was higher than in the previous three months—37 against 33—value being 346 in.-dwt. against 313. The mine did well from premium gold: an amount of £50,827 being received against £17,460 in the December quarter; this was additional to the profit of £448,351 (£470,523). "Vogels" payability was 50 per cent against 37, with value up to 295 in.-dwt. Of the 5,160 ft. sampled on Venterspost, 70 per cent against 65 was payable with a better value, 373 in.-dwt.

UNION CORPORATION

The results of the Rand producers of the Union Corporation indicated that the footage developed on most of the mines fell below that of the December three months. Two of the group's mines—Marievale and East Geduld—disclosed a payable footage less than in the last quarter of 1950. Although Marievale's development of 5,403 ft. was above that previously, only 2,510 ft. were sampled, the pay ratio being 55 per cent and the in.-dwt. 258 (against 206). Sampling on the Kimberley Reef was better and the pay percentage 37 compared with 26. There was no payable footage on the Kimberley Reef of East Geduld, although 528 ft. of development was done. Of the 895 ft. of main reef sampled, 50 per cent proved payable with a value of 221 in.-dwt. On Geduld Proprietary, 2,945 ft. of Black Reef were sampled, of which 12 per cent was payable, the in.-dwt. figure being 205 against 241.

Grootvlei made a good showing and of the 12,375 ft. sampled, 49 per cent was payable of 269 in.-dwt. The company's income from premium gold was more than three times that received in the December quarter: it amounted to £102,148, added to the profit of £905,299 (December quarter profit £923,176). Net earnings after tax were consequently equal to an annual rate of 3s. 4d. If there had been no premium income, this rate would have been more like 2s. 9d.

Van Dyk announced that 775 ft. of development were sampled in the No. 5 shaft area, of which 255 ft. or 33 per cent was payable, averaging 15.6 dwt. over 10 in. or 156 in.-dwt. In the previous quarter it was stated that no payable values were disclosed from the No. 5 shaft development that started during the period.

JOHNNIES GROUP

The most outstanding feature connected with the mines under the aegis of Johannesburg Consolidated, which showed up in the quarterlies, was the benefit being derived from the premium gold sales. The group's mines are amongst the oldest on the Rand and some are coming to the end of their tether. The profits of three were below those announced in the December quarter but they were all materially higher with the premium added. Income from this source was actually greater than the normal working profit of New State Areas (profit £11,624, premium £19,918). Of the 1,097 ft. sampled on this mine, 70 per cent proved payable with a value of 214 in.-dwt.

Extra income from sales of gold at higher than standard price added £12,804 to Wit Gold's profit of £13,437. Twenty-four per cent of the 1,230 ft. sampled proved payable of 122 in.-dwt. The development footage sampled on Government Areas of 11,440 ft. gave 46 per cent payability, which was slightly down but higher in value—265 against 225 in.-dwt.

Although Randfontein's normal profit for the quarter of £143,687 went against £165,475 for the past three months of 1950, the company netted in £83,748 from premium sales compared with £35,905 previously. The footage sampled was 12,110, of which 31 per cent was payable and the value 233 in.-dwt.

GENERAL MINING—ANGLO TRANSVAAL

Developments at West Rand Consolidated during the first quarter of the current year averaged 61 per cent payability and 266 in.-dwt. against 66 per cent and 250 in.-dwt. in the December three months. The total footage of work was 17,643 ft. on six reefs and 9,925 ft. were sampled. The other producer of the General Mining group—South Roodepoort—developed 6,054 ft., of which 2,400 ft. were sampled, 55 per cent proving payable of 240 in.-dwt.

14,182 ft. were developed on Main Reef series in the March quarter by Rand Leases (Anglo-Transvaal). 6,780 ft. were sampled, of which 5,430 ft. or 80 per cent was payable, averaging 255 in.-dwt. Also 705 ft. were sampled on Bird Reef, with 44 per cent payability averaging 166 in.-dwt., while 2,145 ft. sampled on Kimberley Reef gave 39 per cent payability, averaging 204 in.-dwt.

On Wit Nigel, the new development footage accomplished amounted to 4,403 ft., and of the 3,665 ft. sampled, 33 per cent was payable with a value of 219 in.-dwt.

PROGRESS IN THE FREE STATE

The biggest change in the March quarterlies of the Anglo American O.F.S. mines was the increase in work done at Welkom. The bulk of development continued to be on haulage-ways, with a certain amount in the country rock. There was an improvement in footage sampled but a drop in the pay ratio (55 against 69), and the value was 353 in.-dwt. against 561. Erection of the reduction plant at the mine was completed during the quarter.

No. 2 shaft of Free State Geduld was sunk only 159 ft. during the first three months of this year to a depth of 3,883 ft.; operations were held up for a lengthy period by the intersection of very heavy water-bearing strata.

At Western Holdings, No. 1 shaft was sunk to a depth of 3,433 ft., while a depth of 3,298 ft. was attained by No. 2 shaft. The erection of winding plant and machinery went ahead together with mine buildings and preparatory work for the erection of the plant.

At Anglo American's two other O.F.S. "mines in the making"—President Brand and President Steyn—surface work proceeded satisfactorily with mine buildings, winder and compressor house, etc. No. 1 shaft on President Brand attained a depth of 2,213 ft.; No. 2, 1,529 ft. On President Steyn, No. 1 shaft was sunk to a depth of 3,380 ft. and No. 2, 3,035 ft.

The quarterly report of St. Helena (Union Corporation) showed that for the fourth successive quarter development footage increased to 4,545 ft. Of the 2,345 ft. sampled, 51 per cent was payable, the value being 467 in.-dwt. Construction work on the reduction plant was reported to be proceeding satisfactorily.

"Johnnies" reported that at the end of March, the No. 1 shaft at Freddies North was 4,487 ft. deep and No. 2, 3,501 ft. Depths of Freddies South were 3,721 for No. 1 and 4,101 ft. for No. 2. General construction work on both mines proceeded. The parent company—Free State Development—continued to carry out drilling on farms Portland and Brooklands.

"Geoffries" quarterly gave no fresh news of note. The high value discoveries in borehole TV3 from the upper reefs of the region north-west of Odendaalsrus occurred after the end of the period.

Chief news in the Anglo-Transvaal group of O.F.S. mines was that two new boreholes had been started by Middle Wit on farm Van den Heversrust, *viz.*, VDH5 and VDH6. On the Virginia three shafts are being sunk and capital expenditure incurred has reached a total of £2,239,042. At the adjoining Merriespruit, work proceeded on No. 1 shaft, which reached a depth of 1,083 ft. No. 2 shaft remained at 97 ft. Capital expenditure to date has amounted to £1,429,211.

Harmony Gold Mining (Central Mining) has exhausted its funds and arrangements have been made to obtain temporary loan facilities up to £1,000,000 at five per cent from two associated companies. No. 3 shaft is equipped and sunk to a depth of 1,018 ft., while Ventilation shaft is down to 1,161 ft.

For the first time the Stilfontein made a development return in the March quarterly. 1,120 ft. were developed on the Vaal Reef. Of the 520 ft. sampled, 455 ft. were payable, averaging 323 in.-dwt. The Charles shaft is down to 2,766 ft. and the Margaret to 1,536 ft.

Miscellaneous Mining Progress Reports

Statements issued by various gold mining and base metal companies, principally for the March quarter, give outputs and profits, together with development results and mining progress. They relate to Rhodesian, West African, Australian and other undertakings, and the following gives salient points and shortly reviews the position:

RHODESIAN GOLD AND COPPER

More development was done on Cam & Motor during the March quarter (2,572 ft. against 2,117 ft.). Work was spread over the Cam, Cam Spur and Motor Lodes, with some good runs of ore opened up on the latter averaging up to 12.6 dwt. Profit was £72,771 (similar to the previous three months).

Sherwood Star made a profit of £4,298 in the first quarter of the current year from a tonnage of 3,640. No development was done.

Work at Rezende Mines was principally in the Rezende section where mining is being concentrated on the 16th and 20th levels West, and also on opening up the ore body below the 20th level. Mine profit last quarter was £3,940.

Thistle Etna announced a profit of £1,220 against £1,900. Company is repaying 1s. per share capital, reducing the shares to the nominal value of 4s.

At Phoenix Prince, 32,320 tons were crushed in the March quarter, for a yield of 3,490 oz.; revenue was £43,978; profit £11,532. 1,750 ft. of development was done and of the 1,444 ft. on reef, 72 per cent was payable averaging 5.02 dwt.

Falcon Mines quarterly was of particular interest. It reported that profit from the combined milling operations of Sunace and Bay Horse amounted to £12,257 and that the production on wolfram concentrates from Sunace started. The small milling plant at Dalny crushed, 7,700 tons of ore for a profit of £771 after charging £2,727 for development.

Although there was an improvement in the underground labour position at Motapa, the company has continued to experience difficulties in metallurgical recovery. Profit for the March quarter tapered to £11,696 against £16,292. Development footage was 4,749, and of the 1,440 ft. on strike, 320 ft. proved payable of 4.3 dwt.

The position at Bushtick appears precarious. Operations during the March quarter resulted in a loss of £1,638 against a small profit of £596 in the December period. Efforts to improve the labour position were partially successful; grade of ore also improved. Company reports that strict economies are being imposed and that a continuance of operations depends upon the success of efforts being made.

Roan Antelope and Mufulira Copper earned in the first nine months of their current financial year more than in the whole of the previous financial year. Mufulira's estimated profit was £5,193,000; Roan's £4,400,000. Copper produced by the latter amounted to 53,921 tons; Mufulira's production was 57,493 tons. Roan recently announced the doubling of its interim to 20 per cent.

WEST AFRICAN

The estimated profit of Ashanti Goldfields for the March quarter was £269,026, bringing the total for the first six months of the company's financial year to £539,605. Ore crushed amounted to £60,000 tons, yielding 48,087 oz.

Bibiani's estimated profit for the first three months was rather lower at £49,579, bringing the total so far for its financial year to £106,707.

Following on the very satisfactory annual report, Ariston Gold reported encouraging figures for the first six months of its current financial period. Gross mine revenue was £636,691 and the total working profit £286,056.

Konongo did 1,999 ft. of development during the March quarter, but of the 999 ft. sampled, only 3 per cent proved payable. A more encouraging showing was made in the Boabedroo drive which advanced 157 ft. in values of 7.4 dwt., while winzing opened up ore averaging 14.2 dwt. No payable values were found on the Odumase 20th level.

All the work done during the March quarter on Konongo's neighbouring mine—Lyndhurst Deep, proved unpayable. 5,990 tons of this latter company's ore were crushed at Konongo mill and yielded 3,100 oz. gold.

There was little difference in the development done at Taquah & Abosso during the March quarter from that accomplished in the December period. Footage of work was 2,223 ft. and of the 995 ft. of driving sampled, 285 ft. (28.6 per cent) proved payable. The ratio of payable ore obtained from raising and winzing was 55.9 per cent, averaging 14.88 dwt.

The first quarterly report of Nanwa Gold announced that at the reduction works only one primary unit had been in commission. During March 2,497 tons passed through the coarse crushing plant and 2,118 tons were ground. The first 93.60 oz. has been banked. The erection of the remainder of the plant is proceeding.

AUSTRALIAN, NEW ZEALAND, ETC.

The half-yearly progress report of Rosterman (Dec., 1950) stated that there was a surplus from operations on its Kenya property of £19,467. Recovery of gold was 6,742 oz. and the tonnage milled, 22,530 tons. Development and drilling was carried out; the reef proved well defined but values were unpayable.

Operations of the Bulolo Gold Dredging on its property in New Guinea for the nine months ended February, 1951 resulted in a yield of 51,119 oz. of gold (against a corresponding output of 56,247 oz.). Value of the ground dredged 9,513,200 yd., was 18.81 U.S. cents and the total was $1,789,165.

Clutha River, working an alluvial area in New Zealand, reported that dredging of the Alexandra area was completed and that its dredge was working the Earnscleugh area in virgin ground.

Operations at Blackwater Mines for 11 weeks January to end-March were affected by strike of miners who came out "in sympathy" with the New Zealand wharfingers. This forced the closure of the mine for the time being and work was resumed on April 4. Loss caused by stoppage £2,672. The Main Shaft is being deepened with a view to opening up the mine at depth.

Amongst the mixed metal producers, Zinc Corporation reported that from January 1 to March 31, lead concentrates produced amounted to 18,272 tons, containing 13,272 tons lead; 270,159 oz. silver. Zinc concentrates, assaying 52 per cent zinc amounted to 20,484 tons.

During the same period New Broken Hill produced 4,780 tons lead concentrates, containing 3,470 tons lead and 78,311 oz. silver. Zinc concentrates 9,726 tons of 52 per cent Zn.

For the quarter ended March 31, Indian Copper produced 1,554 l.tons copper; 1,692 l.tons rolled brass; 442 l.tons yellow metal circles; 140 l.tons rolled copper and 91 l.tons copper circles. Development was carried out on Mosaboni, Dhobani and Badia.

San Francisco Mines of Mexico reported that during the March quarter 11,133 tons lead were produced, 1,410 tons copper and 17,906 tons zinc.

Messina (Transvaal) recovered 2,894 tons copper in the March quarter against 2,485 tons in the December three months.

In the three months of the current year, Fresnillo—the old Mexican mine—produced 11,488 s.tons lead concentrates, 1,774 tons copper and 11,991 s.tons zinc.

Company News & Views

Central Mining—

The Central Mining and Investment Corporation is associated with Rand Mines Ltd. in the administrative and technical control of twelve producing gold mines in the Transvaal and also certain important land, coal and industrial undertakings.

While the profits for 1950 of Central Mining at £750,850 were £398,913 lower than in 1949, this cannot be taken to mean that the company had an unsatisfactory year. On the contrary, for in 1949 profits included a non-recurring dividend of £370,273, and two exceptional receipts amounting to £196,198 while the only items of a similar nature in 1950 amounted to £38,251. If, therefore, these exceptional items are omitted from the accounts of both years it will be seen that profits during 1950 mounted from about £584,000 to £713,000. The chief factor contributing to that result was an increase in dividend income by approximately £202,000, reflecting the higher dividends received from the company's gold mining investments following upon devaluation.

The reduced profits attracted a lower tax which absorbed £316,450, a decrease of £196,850. Dividends on the increased capital were higher, 2s. 4½d. per share being paid against 2s. 3¾d. in 1949.

The company's financial postion was further strengthened during the year. Net assets now total £10,410,837 against £9,003,035. Since a large proportion of the expanding resources of the company can be easily converted to cash, the Corporation is in a strong position to invest with advantage in the Orange Free State and elsewhere.

—Rand Mines

Rand Mines for 1950 also reflect the benefits arising from devaluation. Income rose by £178,041 to £1,167,227. This increase was almost wholly due to the higher dividend income which rose by £175,477 to £1,125,083. Unaccountably, taxation dropped from £131,011 to £32,417, greatly assisting net profit to advance to £1,080,058 compared with £858,175. Thus, the increased dividend of 140 per cent against 100 per cent absorbing £752,848 was provided with ample cover.

The book value of shares and debentures held increased during the year from £5,383,379 to £5,698,290. Although the market value of the investments was not given, the directors' report stated that the aggregate market value "largely exceeds the book value." The directors also stated that during the year the company took up its proportion of the new shares offered to shareholders in East Rand Proprietary Mines, and acquired a large shareholding in East Rand Gold, Coal & Estate Co. Further, it purchased on the open market an unspecified number of rights in Harmony Gold Mining Co. in addition to those accruing to it as a shareholder in other companies, but since Harmony Gold Mining does not appear as one of the company's principal investments at the end of 1950, presumably these rights and shares were subsequently sold.

General Mining's Increased Investments

General Mining & Finance Corporation is one of the leading mining finance houses in South Africa, and has acquired a substantial portfolio of investments. For the most part these are first-class Rand dividend payers and include East Rand Proprietary, Durban Deep, Crown Mines and a large holding in West Rand Consolidated, which is also under its technical and administrative control. It has also become responsible for South Roodepoort Main Reef as the result of a deal with Consolidated Rand Investment Trust ("Crits"). The Corporation has a large and expanding interest in the Orange Free State developing mines, which is administered through General Exploration Orange Free State which it formed for this purpose soon after the war. During the year prospecting operations undertaken by "Geoffries" through the sinking of boreholes has been, in some cases, spectacularly successful. In particular, this would apply to its borehole TV3 on Spes Bonal 921, in the Hoopstad district, O.F.S., which yielded results as high as 4,118 in.-dwt.

For the fifteenth consecutive year, General Mining & Finance Corporation has maintained their dividend at 25 per cent, or 5s. per £1 share. This was paid out of the profit for 1950 of £513,000 compared with £462,856 in the previous year. The latest balance sheet shows that the book value of the Corporation's investments amounted to £4,130,993 (£3,908,845), the aggregate market value of which the directors stated to be substantially in excess of the balance sheet figure.

The issued capital has increased to £1,677,286 (£1,643,953) of an authorized amount of £2,000,000 in £1 shares.

African and European Pays More

Amongst the Rand finance companies which have been in existence for a long time is African & European Investment. It was registered in the Transvaal in 1904 and has been engaged in financing and developing gold and coal properties in South Africa while it has been closely connected with the farming, agriculture and land development industries. Of more recent years it has expanded its operations and was an early venturer into the Orange Free State. Through its mineral rights over Block 7, it became one of the parents of the Welkom group of mines. It still has a large stake in the field where it has continued with exploratory drilling jointly with other companies. Its formerly held rights in farms Harmony, La Riviera and Eldorado are now represented by shareholdings in Harmony Gold and Loraine Gold. Other shareholdings include Free State Geduld, "Ofsits," Presidents Brand and Steyn, St. Helena, Welkom and Western Holdings. It has shares in Grootvlei, Western Ultra Deep Levels, New Central Wits, Union Steel Corporation etc. Coal interests are mainly centred in the Transvaal, principally through the medium of its associated company the Vereeniging Estates Ltd. The producing collieries under the company's administration include Amalgamated Collieries of S.A., Springbok Collieries, S.A. Coal Estates (Witbank), the Coronation Collieries and Vyrheid Coronation.

The 1950 Report shows profit for the year of £668,620 compared with £874,559, and there is added £414,872 net surplus on realization of Johannesburg building and certain operating farms. Expenditure on mineral rights and prospecting £27,703 (£33,339); amount written off shareholdings, £130,000 against £20,000 previously, while transfer to general reserve is the same, £400,000. Taxation called for £70,000 and the dividend is increased by 5 p.c. to 25 per cent or 2s. 6d., absorbing £325,000 with £78,000 to meet the Preference stock. The unappropriated balance is £264,106.

San Francisco's Bonus Issue

San Francisco Mines of Mexico, the largest single lead-zinc-silver mining unit in Mexico, has been ploughing profits back into its business for many years. As a result, the capital actually employed is now greatly in excess of its issued capital of £1,028,406. In fact, at September 30, 1950, the capital employed amounted to £3,300,000, or more than three times the issued capital. In order, therefore, to bring its working and issued capital in line, the company will propose to stockholders at its annual meeting to be held on June 1 next, the capitalization of £1,028,406 by issuing to stockholders one new share for every one

10s. stock unit held. The consent of the Treasury to this issue has been obtained.

During the year to September 30, 1950, the mill treated a record tonnage of 623,000 tons of ore compared with 580,000 tons in the previous year. Mill capacity is 720,000 tons a year, but the chairman, Mr. C. E. Temperley, in his address to stockholders said that it would take some time before this figure was reached. Development work during the year gave a net addition to ore reserves of around 100,000 tons, which now amount to 4,164,000 tons, equivalent to nearly six years' milling at full capacity.

The profit and loss account disclosed that gross operating profit for the year amounted to £2,158,916 (£1883,591). Mexican and U.K. income taxes reduced this to £1,340,541, so that the net profit for the year figured at £818,375 against £628,525 previously. The dividend was stepped up to 70 per cent (7s. per unit), against 50 per cent previously, and absorbed a net amount of £377,939. The carry forward totalled £176,427 compared with 238,128 previously.

Gopeng Pays 42½ per cent

A consistent water supply throughout the year to September 30, 1950, enabled Gopeng Consolidated to increase its output to 828 tons compared with 721 tons, and reduce its production costs from £103 to £93 1s. 7d. a ton. Although the value of the ground treated at 0.81 lb. per cu. yd. was lower than the 0.95 lb. per cu. yd. recovered in the previous year, the yardage treated amounted to 2,271,700 cu. yd. against 1,714,200. Furthermore, the average price received for tin ore was approximately £52 per ton higher at £392 12s. 2d. per ton.

Gross income reflected the better performance and advanced to £428,431 compared with £310,172. However, this figure included income received from its rubber plantations, which brought in £19,008 against a loss of £455 previously. Profit for the year amounted to £273,224. Taxation required £151,758 (£98,380), general reserve received £10,000 (same), the sum of £19,092 (£5,572) was written off capital expenditure, and after making no less than five separate distributions aggregating 42½ per cent against 30 per cent, absorbing £92,511, the forward balance was increased by £1,883 to £45,777.

During the first six months of the current year ended March 31, 1951, the company's output of tin ore totalled 381.75 tons, and the chairman, Mr. Stanley Wickett, stated that the outlook for the current year was favourable, provided that the more stringent emergency measures did not unduly affect the operation of the mine.

Rand Mine Returns for April

The Kaffir outputs for April made a mixed showing in a 30-day month (compared with 31 days in March) and five Sundays on which the newer mines are prevented by law from milling. Thirteen of the mines, however, dealt with a larger tonnage, 18 milled less and 10 the same as in March. Larger profits were announced by 13 producers while those of 28 were lower. On balance, the trend of mining costs was upwards: 22 mines working at a higher unit cost figure, 18 were lower and one the same.

By crushing an additional thousand tons, Blyvoor established a record, while the increase of nearly £3,000 in profit brought it up to the highest yet attained. City Deep, Durban Deep and Modder B dealt with the same tonnage as in March and recorded increased profits. Lower costs were a feature with most of the Central Mining producers, the exception being Cons. Main Reef with a rise and Durban Deep working at the same figure as previously—the only mine on the Rand to do so.

Two mines of the Gold Fields group wound up the month with higher profits—Robinson Deep and Simmer and Jack; that of Sub Nigel was £7,000 down and Libanon's £1,200. "Vogels," "Venters" and Vlakfontein all dealt with less ore, resulting in lower profits.

The unit working cost of all the Anglo American mines was up. In the case of Brakpan they rose 1s. per ton to 36s. 5d., though the same tonnage as in the previous month was dealt with and profit was £2,700 lower. Springs also dealt with the same tonnage but with 9d. per ton rise in costs, the profit dropped by almost £3,500.

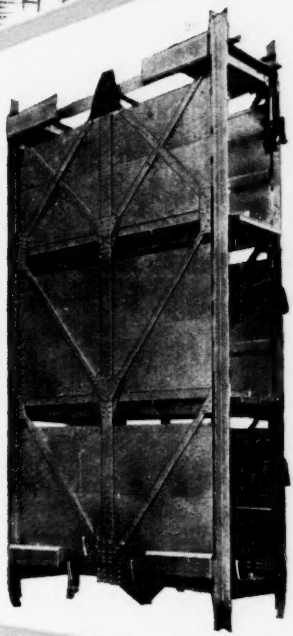
All the Union Corporation producers dealt with lower tonnages and announced smaller profits with the exception of Van Dyk. The only one to distinguish itself with lower costs was East Geduld although its profit was £6,800 down.

Lower working profits were made by all "Johnnies" mines and although Randfontein dealt with the same tonnage for a lower figure of cost, 28s. 7d., the profit was a few pounds down. Notwithstanding higher tonnage and drop of 11d. per ton in costs, the old Wit Gold's profit was much less than the £6,021 made in March.

West Rand dealt with a bigger tonnage for a lower figure of costs, 24s. 8d., but profit was a trifle less. The other member belonging to General Mining, S. Roodepoort, dealt with the same tonnage but profit was rather less. A smaller tonnage dealt with and rise in costs resulted in Rand Leases (Anglo-Transvaal group) announcing a profit of just over £3,000 less than in the preceding month.

SOUTH AFRICA

Blyvoor.—96,000 tons yielded 66,230 oz.; profit £607,708.
Brakpan.—114,000 tons yielded 21,516 oz.; profit £60,012.
City Deep.—164,000 tons yielded 32,906 oz.; profit £81,367.
Consol M.R.—188,000 tons yielded 25,679 oz.; profit £48,170.
Crown.—280,000 tons yielded 47,531 oz.; profit £110,355.
Daggafontein.—232,000 tons yielded 57,491 oz.; profit £445,716.
Durban Roodepoort.—178,000 tons yielded 30,551 oz.; profit £100,980.
East Champ D'or.—31,000 tons yielded £58,287; profit £11,183.
East Dagga.—99,000 tons yielded 18,199 oz.; profit £88,185.
East Geduld.—140,000 tons yielded 42,001 oz.; profit £345,300.
E. Rand Prop.—217,000 tons yielded 44,276 oz.; profit £183,070.
Geduld.—102,000 tons yielded 15,051 oz.; profit £45,248.
Govt. Areas.—225,000 tons yielded £382,170; profit £60,208.
Grootvlei.—191,000 tons yielded 42,984 oz.; profit £290,573.
Libanon.—84,000 tons yielded 15,418 oz.; profit £50,703.
Luipaards Vlei.—98,000 tons yielded 18,138 oz.; profit £60,479.
Marievale.—59,000 tons yielded 14,728 oz.; profit £73,331.
Modder "B."—54,000 tons yielded 6,105 oz.; profit £9,387.
Modder East.—115,000 tons yielded 13,800 oz.; profit £41,257.
New Kleinfontein.—108,000 tons yielded 14,086 oz.; profit £45,009.
New Modder.—21,500 tons yielded 2,603 oz.; profit £1,509.
New State.—57,000 tons yielded £97,257; profit £3,503.
Nigel.—36,000 tons yielded 4,814 oz.; profit £2,413.
Randfontein.—320,000 tons yielded £503,439; profit £50,098.
Rietfontein.—27,000 tons yielded 6,011 oz.; profit £31,872.
Robinson.—109,000 tons yielded 17,505 oz.; profit £14,070.
Rose Deep.—84,000 tons yielded 11,675 oz.; profit £25,204.
Simmer & Jack.—121,000 tons yielded 19,300 oz.; profit £32,263.
S.A. Lands.—113,000 tons yielded 19,819 oz.; profit £79,897.
South Roodepoort.—27,000 tons yielded 5,954 oz.; profit £22,125.
Spaarwater.—10,100 tons yielded 2,254 oz.
Springs.—168,000 tons yielded 21,797 oz.; profit £33,150.
Sub Nigel.—64,000 tons yielded 23,232 oz.; profit £139,899.
Van Dyk.—98,000 tons yielded 15,149 oz.; profit £22,827.
Venterspost.—101,000 tons yielded 21,461 oz.; profit £85,570.
Vlakfontein.—36,500 tons yielded 13,596 oz.; profit £79,643.
Vogelstruisbult.—73,500 tons yielded 18,783 oz.; profit £82,668.
Welgedacht.—32,000 tons yielded 3,858 oz.; profit £4,052.
West Rand Cons.—215,000 tons yielded 34,315 oz.; profit £170,091.
Western Reefs.—96,000 tons yielded 21,739 oz.; profit £114,049.
Wit. Gold.—59,000 tons yielded £83,048; profit £3,558.
Wit. Nigel.—10,000 tons yielded £32,313; profit £1,634.



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RAND LEASES (VOGELSTRUISFONTEIN) GOLD MINING COMPANY, LTD.

Directors' Report for Quarter ended 31st March, 1951

PRODUCTION

Tons crushed: **522,000** yielding **84,803** ounces fine.

	£	Per ton crushed s.	d.	
Revenue from Gold	**1,055,220**	**40**	**5**	
Working Costs	**803,476**	**30**	**9**	(**189s. 6d.** per oz. fine)
	251,744	**9**	**8**	
Sundry Revenue...	**12,500**		**5**	
Working Profit for the Quarter	**264,244**	**10**	**1**	

Working Costs per ton: **30s. 9d.** include **4s. 7d.** per ton in respect of Development Expenditure.

In addition to the above revenue, **£59,095** accrued in respect of increased revenue from the sales of gold at higher than standard prices, sold for manufacturing purposes during the three months, January to March, 1951, inclusive.

The Working Profit for the Quarter, as shown above, does not take into consideration the amount estimated at **£120,000** for the Quarter, payable to the Government in taxation and as its share of profits in terms of the Mining Lease.

CAPITAL EXPENDITURE

The Expenditure on Capital Account for the Quarter amounted to **£71,140.**

SHAFT SINKING

No. 11A SUBVERTICAL SHAFT was sunk **213** feet for the Quarter to a total depth of **1,982** feet. In addition, **216** cubic feet of station cutting were excavated on the 32nd Level, and **11,664** cubic feet of station cutting were excavated on the 33rd Level. The shaft was concrete-lined to a depth of **1,954** feet, of which **228** feet were accomplished during the Quarter.

No. 2 KIMBERLEY REEF INCLINE SHAFT is being advanced by winzing from surface, and rising from the 2nd and 4th Levels. A total of **15** feet have been winzed; and **755** feet risen, of which **15** feet of winzing and **161** feet of rising were accomplished during the quarter.

DEVELOPMENT

MAIN REEF SERIES—**14,182** feet of development and shaft sinking were accomplished, of which **6,780** feet were sampled, showing **5,430** feet, equal to **80** per cent, as payable, at an average value of **14.52** dwts., over a reef width of **17.6** inches, equivalent to **255** inch-dwts. Payable Reef disclosures were distributed as follows:—

SOUTH REEF—Of **655** feet sampled, **450** feet, equal to 69 per cent, were payable, at an average value of **21.54** dwts., over an average reef width of **8.1** inches, equivalent to **174** inch-dwts.

MAIN REEF LEADER—Of **4,300** feet sampled, **3,595** feet, equal to **84** per cent, were payable, at an average value of **17.70** dwts. over an average reef width of **15.5** inches, equivalent to **275** inch-dwts.

MAIN REEF—Of **1,825** feet sampled, **1,385** feet, equal to **76** per cent, were payable, at an average value of **8.86** dwts., over an average reef width of **25.9** inches, equivalent to **230** inch-dwts.

BIRD AND KIMBERLEY REEFS—In addition to the above footage on Main Reef Series, **767** feet were advanced on Bird Reef and **3,526** feet on Kimberley Reef. Payable Reef disclosures were as follows:—

BIRD REEF—Of **705** feet sampled, **310** feet, equal to **44** per cent, were payable, at an average value of **3.61** dwts., over an average reef width of **45.8** inches, equivalent to **166** inch-dwts.

KIMBERLEY REEF—Of **2,145** feet sampled, **845** feet, equal to **39** per cent, were payable, at an average value of **3.04** dwts. over an average width of **67.1** inches, equivalent to **204** inch-dwts.

(The above results are based on actual sampling. No allowance has been made for adjustments necessary in the valuation of the corresponding Ore Reserve.)

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RAILS FLAT BOTTOM

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Beralt Tin and Wolfram 25% *i*
Bulolo Gold Dredging 25c. *i* (June 11)
Cons. African Selection Trust 25% *i* (June 7)
General Mining and Finance 3s. (May 14)
Mining Trust 6d. (June 28)
Stream-Line Filters 10% *i*
San Francisco Mines of Mexico 70% (June 8)
Tecalemit 3% *i*
Trinidad Central Oilfields 25%
Trinidad Leaseholds 5% • (June 12)
United Tin Areas of Nigeria 7½%

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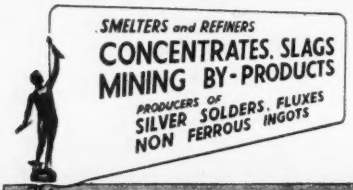

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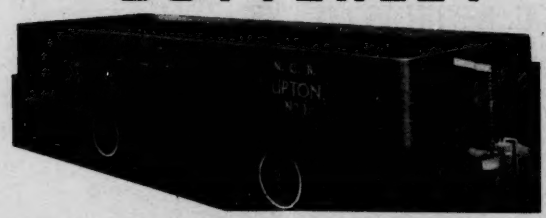

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